OMRON

Portable Multi Logger

ZR-RX20

User's Manual

Cat. No. Z257-E1-03

Introduction

This manual provides information regarding functions, performance and operating methods that are required for using the ZR-RX20.
When using the ZR-RX20, be sure to observe the following:
- The ZR-RX20 must be operated by personnel knowledgeable in electrical engineering.
- To ensure correct use, please read this manual thoroughly to deepen your understanding of the product.
- Please keep this manual in a safe place so that it can be referred to whenever necessary.

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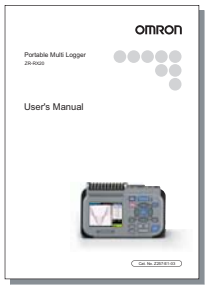
Type of Manuals

The manuals of the ZR-RX20 series consist of the following.
Select the manual suitable for your purpose and read it before starting operation.

Manual packaged in the product (brochure)



User's Manual (this manual)

- Information for safe and correct use
- Before use: connection and wiring in details, language change of display, etc.
- Procedure in details for setting and measurement
- Specifications of the ZR-RX20 series and accessories
- Other information which is required for the use of the ZR-RX20 series

Manuals contained in the utility CD-ROM (pdf data)

Software Manual

Information for installing PC software, basic operation, explanation of screen and setting methods is described.
Two PC software manuals are contained:
- Special PC software "Wave Inspire RX"
- Basic PC software "Smart Viewer RXW"

User's Manual (this manual)

Same contents as the above referenced "User's Manual" packaged in the product.

User's Manual

APPLICATION CONSIDERATIONS (Please Read)

BEFORE USE 1

SETTINGS AND MEASUREMENT 2

SPECIFICATIONS 3

APPENDIX 4

Portable Multi Logger

ZR-RX20

READ AND UNDERSTAND THIS DOCUMENT

Please read and understand this document before using the products. Please consult your OMRON representative if you have any questions or comments.

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- Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this document.

- Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
- Systems, machines, and equipment that could present a risk to life or property.

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CHANGE IN SPECIFICATIONS

Product specifications and accessories may be changed at any time based on improvements and other reasons.

It is our practice to change model numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the product may be changed without any notice. When in doubt, special model numbers may be assigned to fix or establish key specifications for your application on your request. Please consult with your OMRON representative at any time to confirm actual specifications of purchased products.

DIMENSIONS AND WEIGHTS

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

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The following signal words are used in this manual.

Meanings of Signal Words

The following signal words are used in this manual.

⚠ WARNING	Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury, or may result in serious injury or death. Additionally there may be significant property damage.
⚠ CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or in property damage.

Meanings of Alert Symbols

The following alert symbols are used in this manual.

	Indicates the possibility of explosion under specific conditions.
	Indicates the possibility of electric shock under specific conditions.
	Indicates prohibition when there is a risk of minor injury from electrical shock or other source if the product is disassembled.
	Indicates general prohibitions for which there is no specific symbol.

Alert Statements in this Manual

The following alert statements apply to the products in this manual. Each alert statement also appears at the locations needed in this manual to attract your attention.

⚠ WARNING

This product cannot be used for directly or indirectly detecting human bodies to ensure safety.

Do not use this product as a human body protection device.

Serious hazard may occur in rare occasions due to ignition, rupture or combustion of the lithium battery contained in this product.

Never disassemble, deform under pressure, heat or incinerate this product.

Serious hazard may occur in rare occasions due to ignition, rupture or combustion.

Never disassemble, deform under pressure, heat or incinerate the lithium ion battery pack ZR-XRB1 (GRAPHTEC: B-517).

⚠ CAUTION

Injuries from electric shock may occur in rare occasions as the result of disassembly.

Never disassemble, deform under pressure or incinerate the main unit.

Hazard may occur from serious fire or electric shock.

Do not connect voltages exceeding the rated voltage to the signal input terminals.

Fire or hazard may occur in rare occasions from ignition, rupture or combustion.

Do not use battery packs other than ZR-XRB1.

Precautions for Safe Use

Be sure to observe the following items as they are very important to ensure safety.

1.Installation environment

- Do not store or use in locations where the temperature exceeds the rated range.
- Do not use in locations where the relative humidity exceeds the 30 to 80 %RH range.
- Do not use in locations subject to steam.
- Do not use in flammable or explodable gas environment.

2.Power supply and wiring

- Do not connect voltages exceeding the rated voltage to signal cables.
- Be sure to check the polarity of the signals when connecting the signal cables.
- When using the battery pack, be sure to read the cautions on the battery pack carefully for correct usage.
- Be sure to use only the specified battery pack.
- Be sure to use only the AC cable and the AC adapter provided as standard accessories.
- Do not connect power supplies exceeding the rated voltage to the AC adapter.
- Be sure to turn off the power supply when connecting to the input terminals.
- Do not touch the input terminals during measurement.

3.Installation category

- The ZR-RX20 conforms to the IEC60664-1 installation category I, and must not be used under the environment of the installation category II, III and IV.

4.Others

- Dispose of this product as industrial waste.
- If there are any troubles, stop usage immediately, turn off the power supply and contact OMRON branch or sales office.

Precautions for Correct Use

Please observe the following precautions to prevent inoperability, misoperation of the product or negative effects on the performance and the device.

1.Installation Location

Do not install this product in the following locations.

- Locations where the temperature exceeds the rated range
- Locations where severe changes in temperature occur (where condensation occurs)
- Locations subject to corrosive or flammable gases
- Locations subject to dust, salt or iron powder
- Locations subject to direct shock or vibration
- Locations subject to direct sunlight or near heating devices
- Locations where water, oil or chemical products may be splashed
- Locations subject to strong magnetic fields or strong electric fields

2.Power supply, connecting and wiring

- The cables should be wired apart from high-tension or power lines.
  Malfunction or damage may occur due to induction.
- After wiring, check the adequacy of power supply voltage, miswiring such as overvoltage/load short-circuiting and adequacy of load current before turning on the power supply.
  Malfunction may occur due to miswiring and such.
- Always turn off the power supply when attaching or removing peripheral devices.
  Attaching or removing of peripheral devices with the power supply on can cause malfunction or data corruption.

3.Installation

- Do not cover the vent hole when using this product.
  Leave at least 30cm of installation space around this product.
  The generated heat may cause malfunction or damage.
- When measuring temperature, install the product so that the input terminals are not subject to severe changes in temperature by wind or sunlight.
  It may cause calculation errors.
- Do not install this product in a slanted or vertical position.
- Connect the GND terminal for safe measurement. This product must also be grounded when sharing a common ground level with other devices.

4.Warm up

- For stable measurement, wait at least 30 minutes after turning on the power supply before using.

5.Handling

- Be sure to take backups of captured data in your PC. The captured content may be altered or lost due to misuse or malfunctions during usage.
- Do not drop or apply strong impact or force to the product.
  It may cause malfunction of the monitor or the main unit.

6.Maintenance

- Do not use thinner, benzine, acetone or kerosene to clean this product.
- Calibration should be performed periodically to maintain measurement accuracy.

Checking the Accessories

Item	Remarks	Quantity
Standard Set ZR-RX20A	Main unit AC adapter/AC cable User's Manual (this manual) Utility disk (CD-ROM) • Specal PC software "Wave Inspire RX" (tryout) • Basic PC software "Smart Viewer RXW" • User's Manual PDF files (this manual) • "Wave Inspire RX" Software Manual PDF files • "Smart Viewer RXW" Software Manual PDF files	1 1 1 1

Editor's Note

■ Meaning of Symbols

Menu items that are displayed on the ZR-RX20's LCD screen, and windows, dialog boxes and other GUI elements displayed on the PC are indicated enclosed by brackets "[ ]".

■ Visual Aids

Important Indicates points that are important to achieve the full product performance, such as operational precautions.

Note Indicates application procedures.

Indicates pages where related information can be found.

MEMO

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Features

The ZR-RX20 (with color monitor and internal memory) are compact, lightweight data loggers.

Attaching USB memory device to the ZR-RX20 allows you to capture a large volume of measured data directly in the USB memory device. Furthermore, the data loggers can be connected to a PC via USB to enable on-line settings, measurement, and data capture.

Input

- Adoption of an M3 screw type terminal facilitates wiring.
- The ZR-RX20 enables setting of menus to be made using dedicated keys and interactive menus, using just one hand.

Display

- With the ZR-RX20's 3.5-inch TFT color liquid crystal display, you can confirm the waveforms of measured data and each channel's settings at a glance.

Data Capture

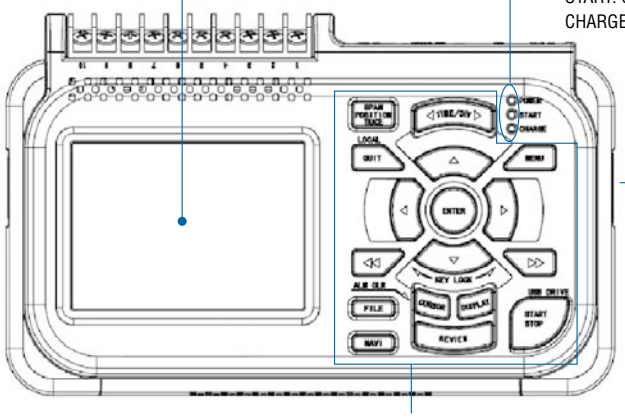
- A large volume of measured data can be saved to a USB memory device.
- Internal memory used for the built-in memory maintains captured data even after the power is turned off.
- The Internal memory can be used with disk images thus multiple data items can be maintained.
- For voltage and humidity measurements, data can be captured up to a sampling speed of 10 ms/1ch by setting fewer channels for measurement (sampling speed is 100 ms and above for temperature measurements).

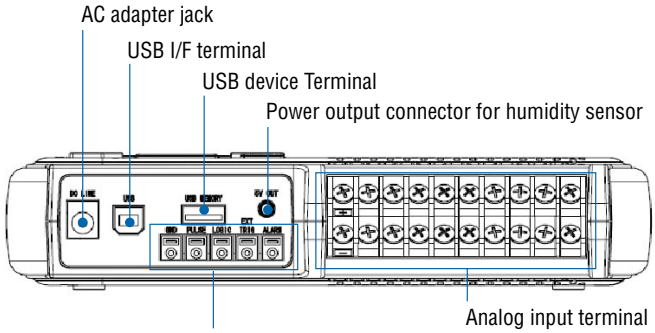
Data Control & Processing

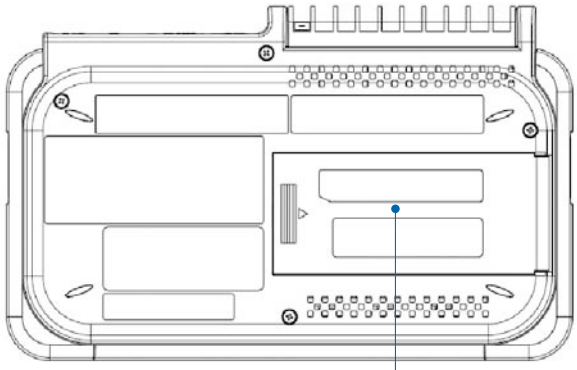
- The PC software provided lets you set conditions and monitor data on on a computer using the USB interface.
- The application software allows you to control multiple ZR-RX20 units from a single computer to easily perform multi-channel measurements.
- The USB drive mode function enables the ZR-RX20's internal memory to be recognized as an external drive by your PC. (Connect the ZR-RX20 to your PC and turn on the power supply to the ZR-RX20 while holding down the [START] key.)
- Captured data can be read from the PC software to files and displayed for processing.
- Data can be transferred off-line to a computer using USB memory device.

Part Names and Functions

This section describes the names and function of parts of the ZR-RX20.


Monitor
Operation status LED
POWER: ON when the power is ON
START: ON during data capture
CHARGE: ON while the battery is charging
Power switch
Control panel keys





Connecting the Power Cable

This section describes how to connect the power cable and turn on the power. The connection method will vary depending on the type of power supply used.

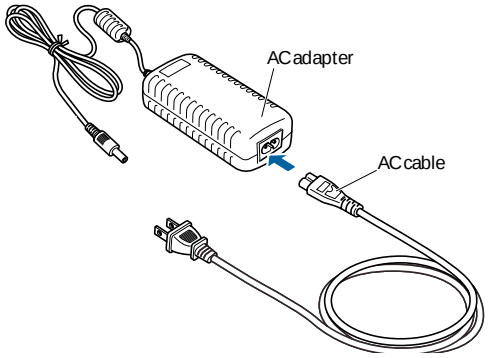
Connecting to an AC Power Supply

Use the AC cable and AC adapter that are provided as accessories.

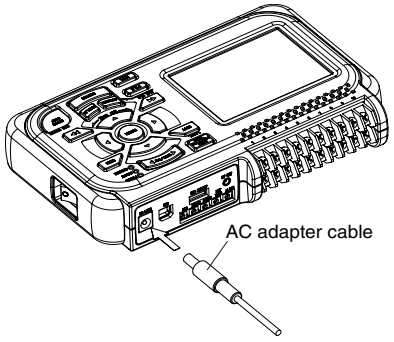
Important

Be sure to use only the AC cable and the AC adapter provided as standard accessories.

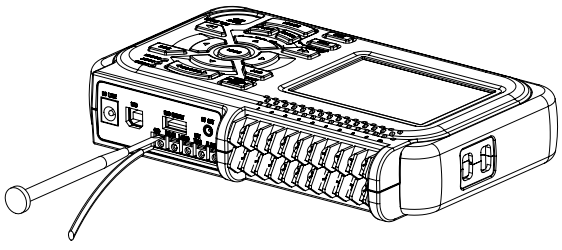
1 **Plug the AC cable into the AC adapter.**



2 **Connect the output side of the AC adapter to the AC adapter connector.**



3 **Using the flat-blade screwdriver, press against the minus (-) button above the GND terminal, while connecting the grounding cable to the ZR-RX20. Connect the other end of the cable to ground.**



Note

The grounding cable is not provided as a standard accessory and must be prepared separately.
[Recommended Cord Diameter : AWG18/UL1007]

4 **Plug the AC cable into the mains power outlet.**

5 **Press the power switch on the ZR-RX20 to the ON side to turn on the power.**

Important

Connect the GND terminal for safe measurement. The ZR-RX20 must also be grounded when sharing a common ground level with other devices.

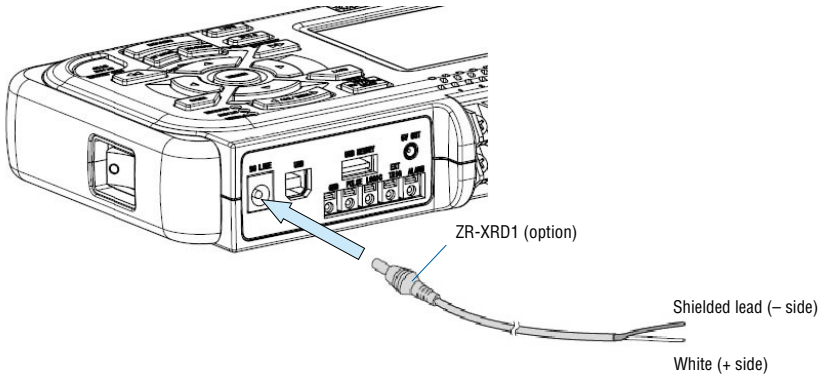
Connecting to a DC Power Supply

Use the DC cable (sold separately: ZR-XRD1).

Important

Be sure to use the separately sold DC cable (ZR-XRD1). Do not apply voltages exceeding the rated voltage (DC8.5 to 24V).

1 **Connect the DC output side to the power supply connector on the ZR-RX20.**



2 **Connect the DC input side to the DC power supply.**

Important

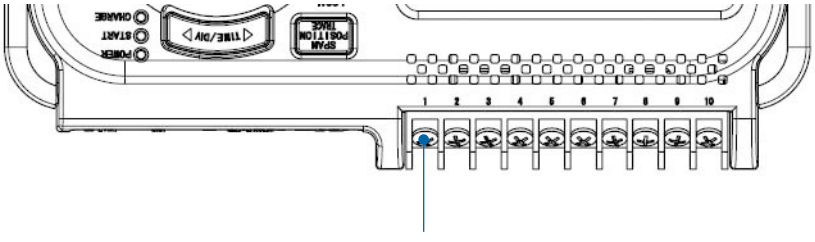
Be sure to check the polarity of the power supply when connecting the DC cable.

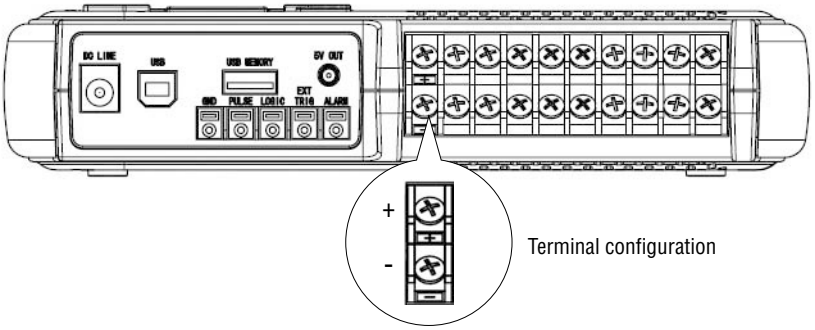
3 **Press the power switch on the ZR-RX20 to the ON side to turn on the power.**

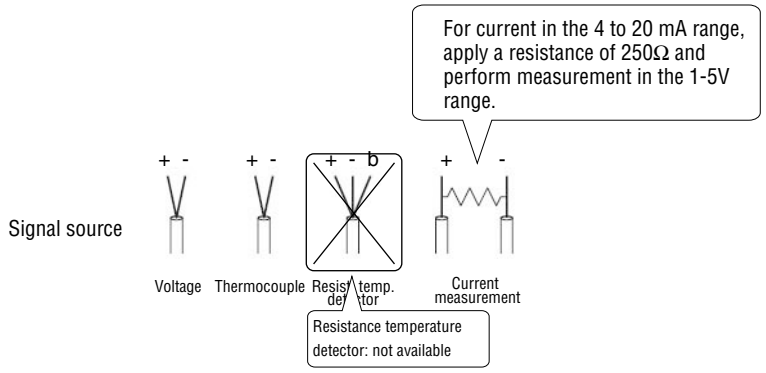
Connecting the Analog Input Terminal

This section describes how to connect the analog input terminal.

Terminal Configuration and Signal Types






For current in the 4 to 20 mA range, apply a resistance of 250Ω and perform measurement in the 1-5V range.
Signal source
+ -
+ -
+ - b
+ -
Voltage
Thermocouple
Resistance temp. detector
Current measurement
Resistance temperature detector: not available

\+ ..... High-voltage terminal (terminal for high-voltage input signals)

– ..... Low-voltage terminal (terminal for low-voltage input signals)

Item	Description
Input configuration	Isolated input, scanning
Analog voltage	20, 50, 100, 200, 500 mV/F.S.; 1, 2, 5, 10, 20, 50 V/F.S.; 1-5V
Thermocouples	K, J, E, T, R, S, B, N, W (WRe 5-26)

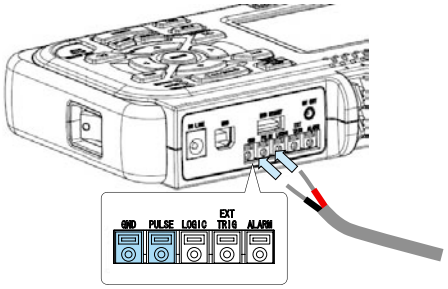
Connecting the External I/O Terminal

Connecting the pulse input terminal

To measure pulse signals, wire the cable to the PULSE terminal as shown below.

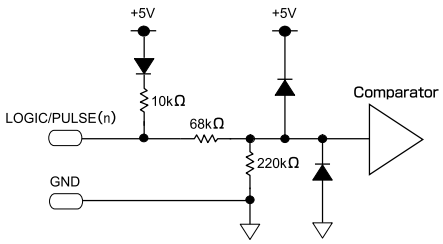
Use a flat-blade screwdriver to push the minus (-) button above the terminal, insert the wire and then remove the screwdriver.

After finishing wiring, lightly pull the wire to make sure it does not come out.



Item	Description
Number of channels	1
Input voltage range	0 to +24V max. (single-ended ground input)
Threshold level	+2.5V
Hysteresis	Approx. 0.5 V (+2.5 to +3 V)

Internal Equivalence Circuit

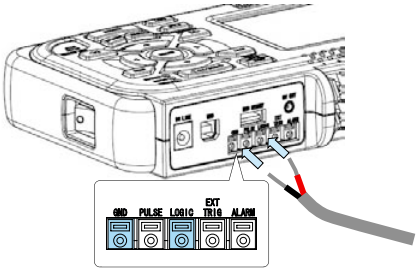


Connecting the logic input terminal

To measure logic signals, wire the cable to the LOGIC terminal as shown below.

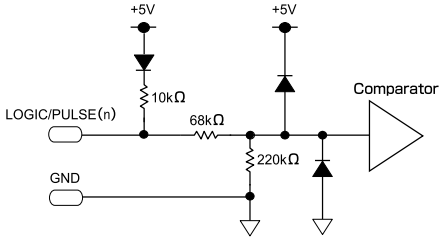
Use a flat-blade screwdriver to push the minus (-) button above the terminal, insert the wire and then remove the screwdriver.

After finishing wiring, lightly pull the wire to make sure it does not come out.



Item	Description
Number of channels	1
Input voltage range	0 to +24V max. (single-ended ground input)
Threshold level	+2.5V
Hysteresis	Approx. 0.5 V (+2.5 to +3 V)

Internal Equivalence Circuit

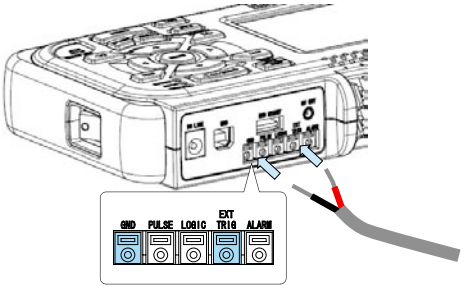


Connecting the trigger input terminal

To input trigger signals from an external device, wire the cable to the EXT TRIG terminal as shown below.

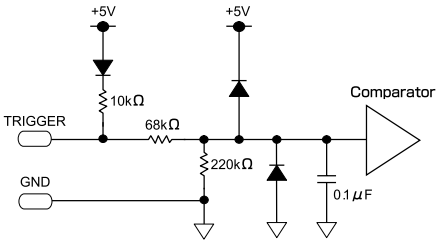
Use a flat-blade screwdriver to push the minus (–) button above the terminal, insert the wire and then remove the screwdriver.

After finishing wiring, lightly pull the wire to make sure it does not come out.



Item	Description
Number of channels	1
Input voltage range	0 to +24V max. (single-ended ground input)
Threshold level	+2.5V
Hysteresis	Approx. 0.5 V (+2.5 to +3 V)

Internal Equivalence Circuit

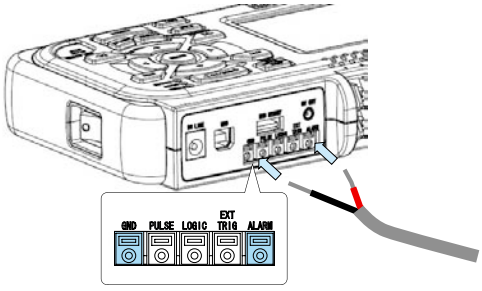


Connecting the alarm output terminal

To output alarm signals, wire the cable to the ALARM terminal as shown below.

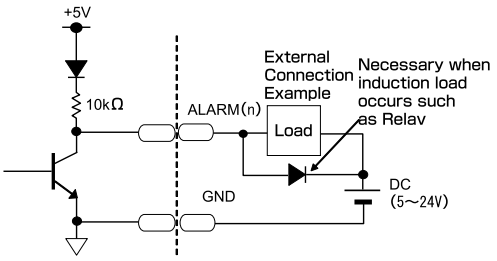
Use a flat-blade screwdriver to push the minus (-) button above the terminal, insert the wire and then remove the screwdriver.

After finishing wiring, lightly pull the wire to make sure it does not come out.



Item	Description
Number of channels	1
Maximum rating	DC30V 0.5A or less

Internal Equivalence Circuit and Example of Wiring Connection

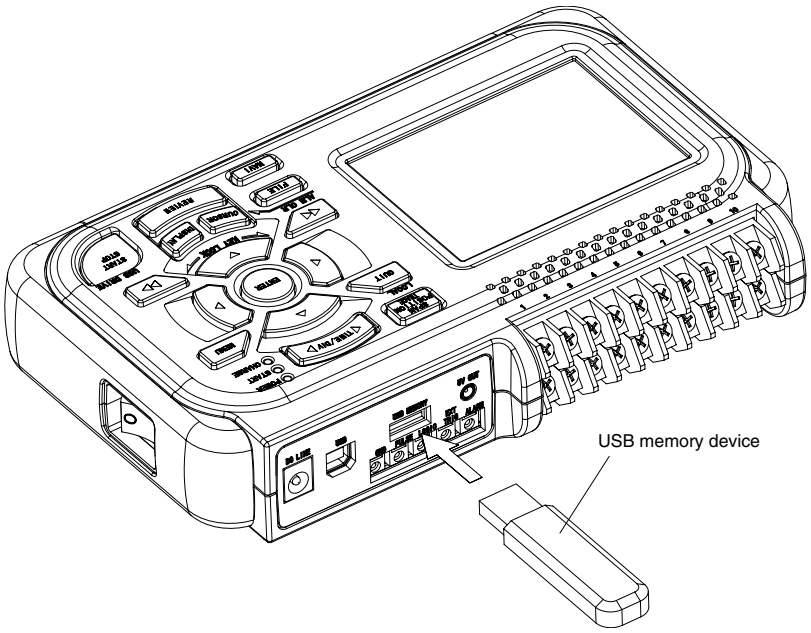


Attaching USB Memory Device

Attaching USB memory device to the ZR-RX20 allows you store measured data directly.

Inserting a USB Memory Device

Attach the USB memory device to the USB device terminal.



Important

<Specifications of supported USB memory>

- Power source : +5 V
- Power consumption : 250 mA or below
- Capacity : No limit (except each file must be within 2 GB)

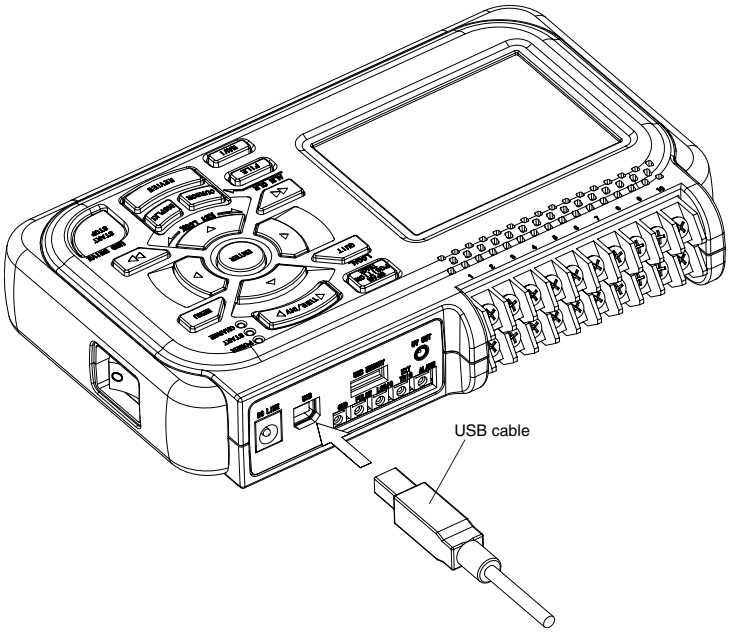
* USB memory device with security functions such as fingerprint authentication cannot be used.

Connecting to a PC

Use the USB cable to connect the ZR-RX20 to a PC.

Connection Using a USB Cable

Use the USB cable to connect the ZR-RX20 to a PC.



Note

If the USB cable is used, install the USB driver in your PC.

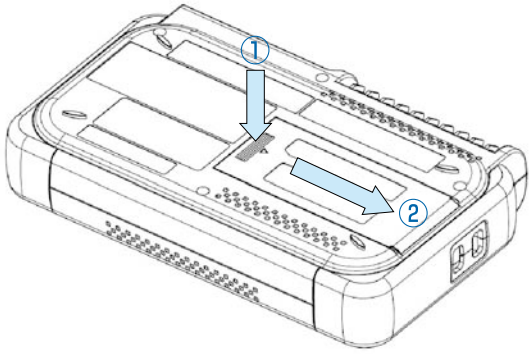
: "Installing the USB driver" in the Software Manual

Using the Battery Pack

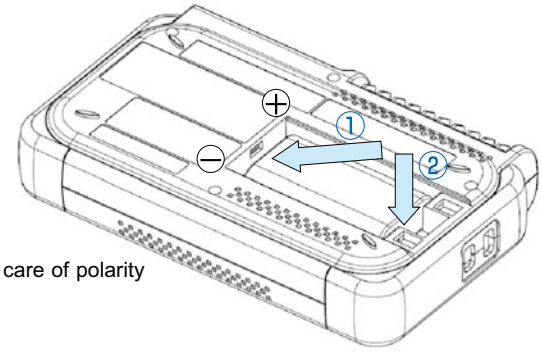
Be sure to use the dedicated battery pack (option: ZR-XRB1).

Mounting the Battery Pack

1 **While lightly pushing the grip of the battery cover, slid the cover in the direction indicated by the arrow.**

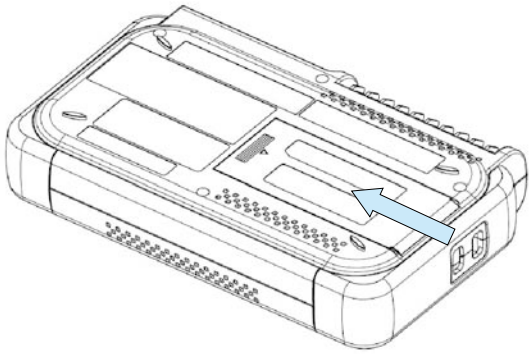


2 **Attach the battery pack (ZR-XRB1).**



Attach the battery with care of polarity and insertion direction.

3 **Attach the battery cover.**



Charging the Battery

Note

Expected time required for charging: Approx. 4 hours

The battery pack is charged by mounting it in the ZR-RX20, attaching AC adapter to the ZR-RX20.

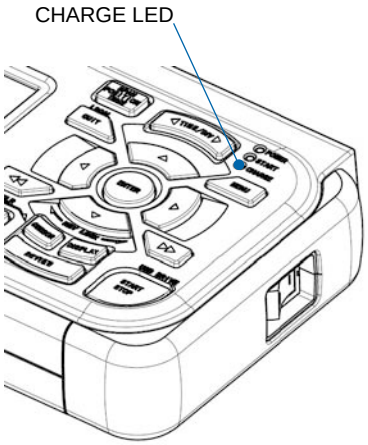
1 **Mount the battery pack in the ZR-RX20.**

See the previous section for the mounting procedure.

2 **Connect the ZR-RX20 to the AC power supply.**

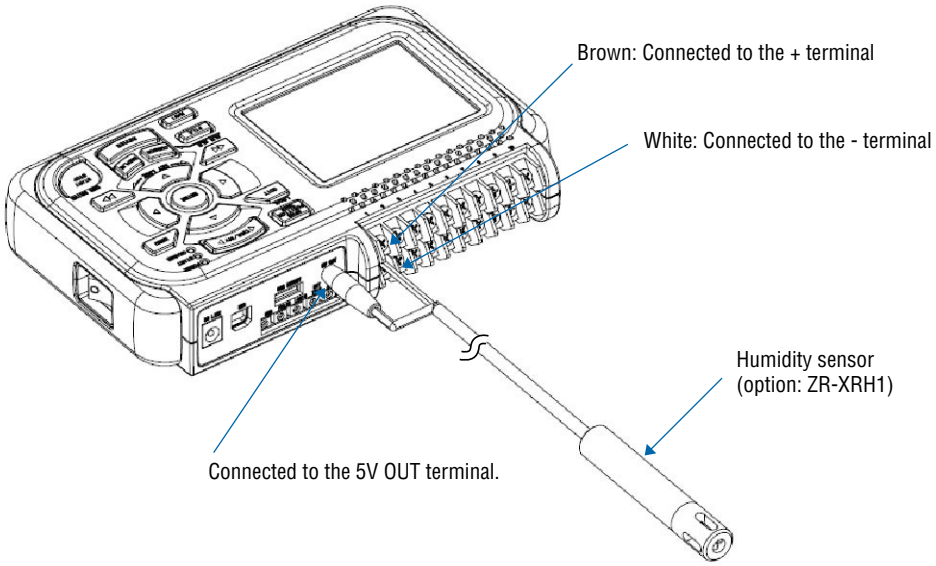
See "Connecting the Power Cable" p.16.

The CHARGE LED lights.



Connecting the Humidity Sensor

Connect the + and - lead wires of the humidity sensor (option: ZR-XRH1) to the desired terminals, and then insert the round connector into the 5V OUT connector on the ZR-RX20.


Brown: Connected to the + terminal
White: Connected to the - terminal
Humidity sensor
(option: ZR-XRH1)
Connected to the 5V OUT terminal.

Precautions to Observe When Performing Measurement

Please be sure to read the following carefully in order to prevent electric shocks or shorts.

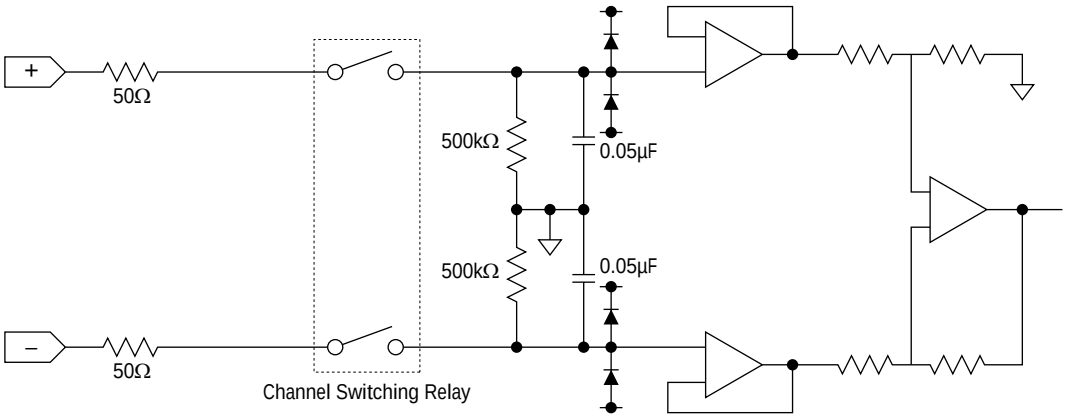
Note

Electric shock or damage to the instrument may occur. Do not input voltages exceeding the rated voltage to the analog input terminal.

Important

Be sure to use only the AC cable and the AC adapter provided as standard accessories. Do not connect power supplies exceeding the rated voltage to the AC adapter.

Input Circuit Diagram for Analog Input (Voltage, Thermocouples)



Important

Capacitors have been incorporated into the input circuit to increase the noise elimination capability.

After voltage measurement, when the inputs have been disconnected, there will still be some electric charge remaining. Before starting another measurement operation, short-circuit the + and - terminals to enable self-discharge.

The ZR-RX20 has a scan system.

While in the status (open) in which signals are not input to the input terminal, measured results may be influenced by signals from other channels.

In such a case, turn OFF the input setting or short circuit +/-.

If signals are input correctly, measured results are not influenced by other channels.

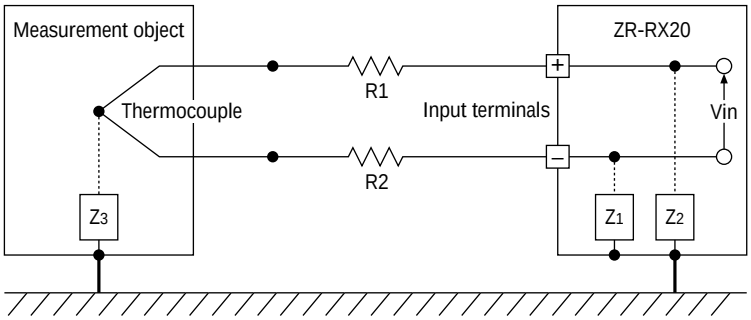
Noise Countermeasures

Connect the ground wire in the following method if the measured values are unstable due to noise.

Connect the ZR-RX20's GND to ground.

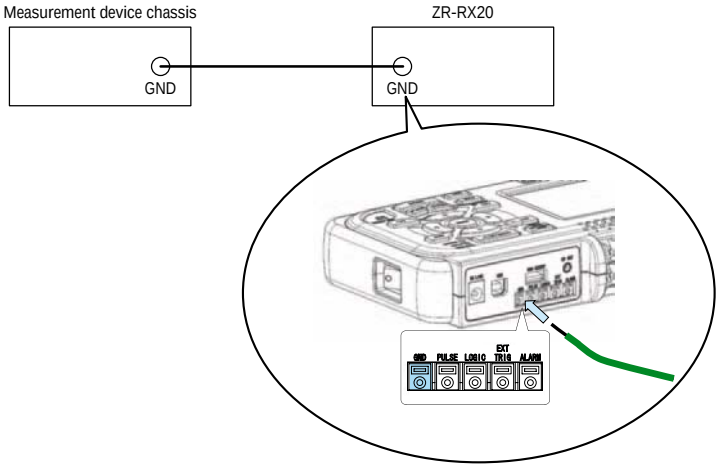
Be sure to connect the chassis GND of the object to be measured.

It may become effective by ensuring that the chassis GND wire of the measurement object is connected to a good ground.



Connect the signal chassis GND and the ZR-RX20's chassis GND.

Use a short, thick lead to connect the chassis GND of the measurement object to the ZR-RX20's chassis GND. It will become even more effective if the ground potentials are the same.



Note

To make use of the ZR-RX20's digital filter function, set the commercial power frequency you use.
(Remove 50 Hz or 60 Hz noise.)
The effective sampling speed is 500 ms and up.

For details on the setting method, see on p.57.

In the AMP Settings menu, set Filter to any setting other than OFF.

Set the sampling interval which enables ZR-RX20 digital filter (see table below).

Set the AC line frequency in the "OTHR" menu.

For details on the setting method, see on p.57.

Setting the Date and Time

The ZR-RX20 includes a rechargeable internal battery for backup.

If you are using the ZR-RX20 for the first time, charge the internal rechargeable battery and then make the date and time settings.

Note

If the ZR-RX20 is not used for a period of approximately three months, the internal rechargeable battery may be discharged and the date and time may revert to the initial settings. If this happens, recharge the battery before using the ZR-RX20.

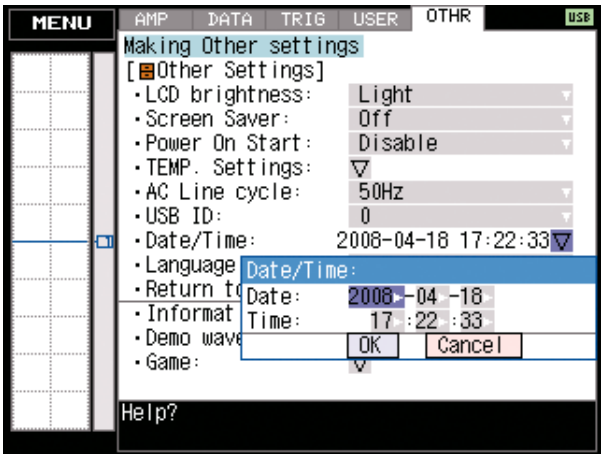
How to Recharge the Rechargeable Battery

Connect the ZR-RX20 and the AC power supply, turn on the power switch, and then leave the ZR-RX20 connected for at least 24 hours.

How to Set the Date and Time

Press the [MENU] key, display the "OTHR" screen, and then set the date and time at the Date/Time Settings sub-menu.

For details, see "Date/Time" on p.57.



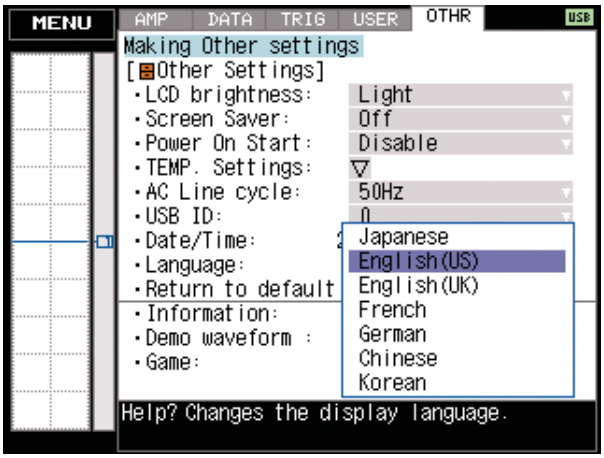
Changing the Display Language

You can choose the language displayed on the screen. The default display language is set to English when the ZR-RX20 is shipped overseas.

ZR-RX20A: Japanese

ZR-RX20A-E,-U,-B,-CHRO: English

To change the display language, see the instructions in "OTHR:Language".



MEMO

SETTINGS AND MEASUREMENT

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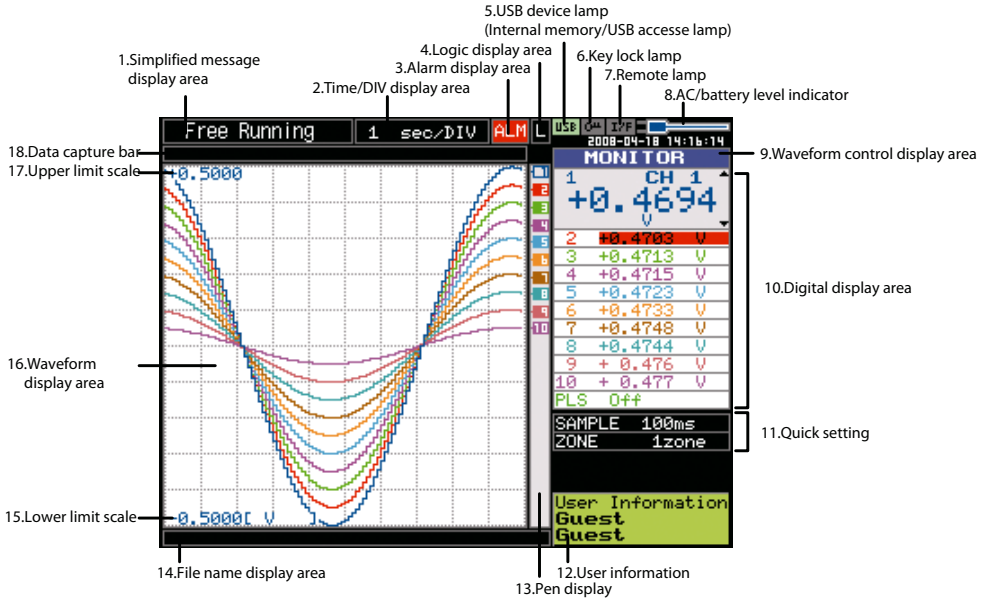
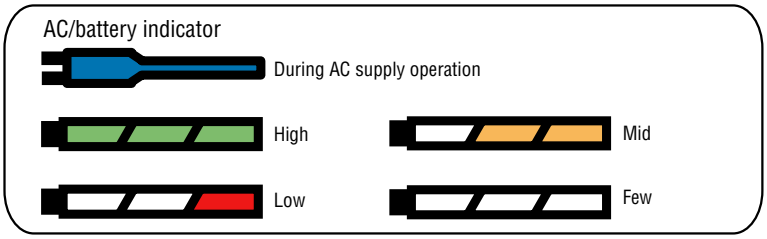
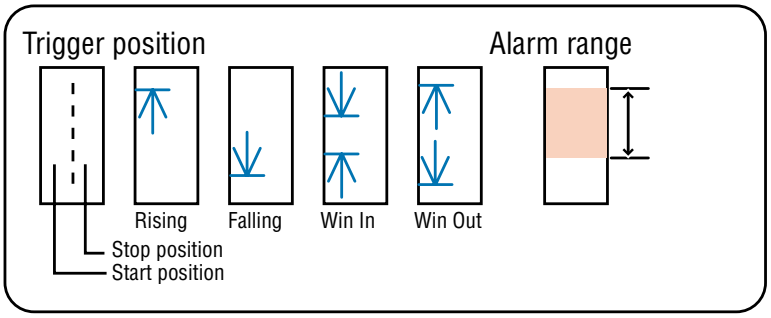
Window names and functions

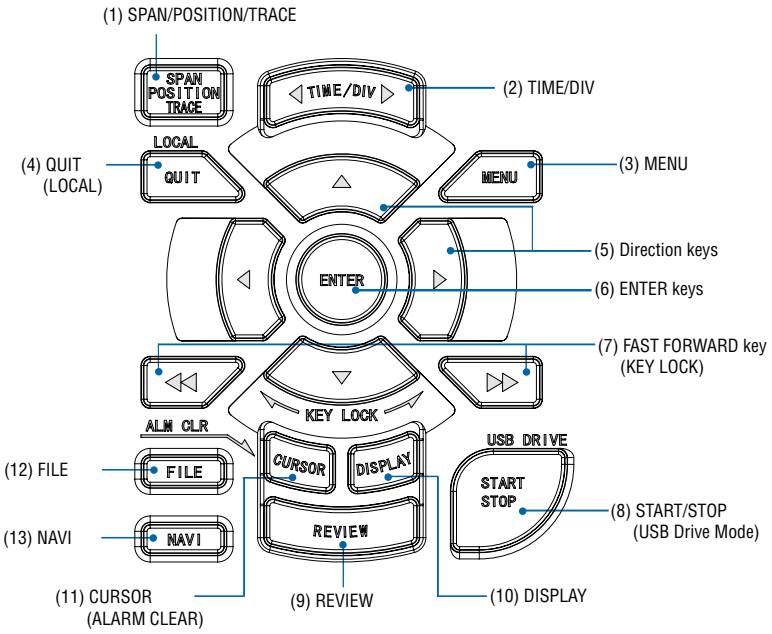


Item	Description
(1) Simplified message display area	Displays the operation status.
(2) Time/DIV display area	Displays the current time scale.
(3) Alarm display area	Displays the alarm output terminal status. (Red = Alarm generated issued, White = Alarm not generated)
(4) Logic display area	Displays the logic signal status. (Blue = Hi, White = Low)
(5) USB device lamp	Lights in green while the USB device is inserted. Lights in red when the main memory and USB device are accessed.
(6) Key lock lamp	Displays the key lock status. (Yellow = Locked, White = Unlocked)
(7) Remote lamp	Lit when the ZR-RX20 is in remote mode (Yellow = Remote mode, White = Local mode)
(8) AC/battery status indicator	Displays the icon when AC power is used and indicates the level when the battery is used. 

Item	Description
(9) Waveform control display area	Displays the mode when using the [SPAN/POSITION/TRACE] key to control the waveform.
(10) Digital display area	Displays the input value of each channel. Use the ▽△ key to select the channel you want to activate (enlarged display). The waveform of the active channel is displayed at the top.
(11) Quick settings	Displays items available for easy operation. Use the ▽△ key to activate the Quick setting area and the ◁▷ key to change values.
(12) User information	Displays information about the currently selected user.
(13) Pen display	Displays the position of each channel signal, trigger and alarm range. 
(14) File name display area	Displays the name of the file used to capture data. Displays the replay file name during replay.
(15) Lower limit scale	Displays the lower limit scale of the currently active channel.
(16) Waveform display area	Displays the waveform of the input signal.
(17) Upper limit scale	Displays the upper limit scale of the currently active channel.
(18) Data capture bar	Indicates the remaining capacity of the capture media during data capture. During replay, indicates information about the displayed position.

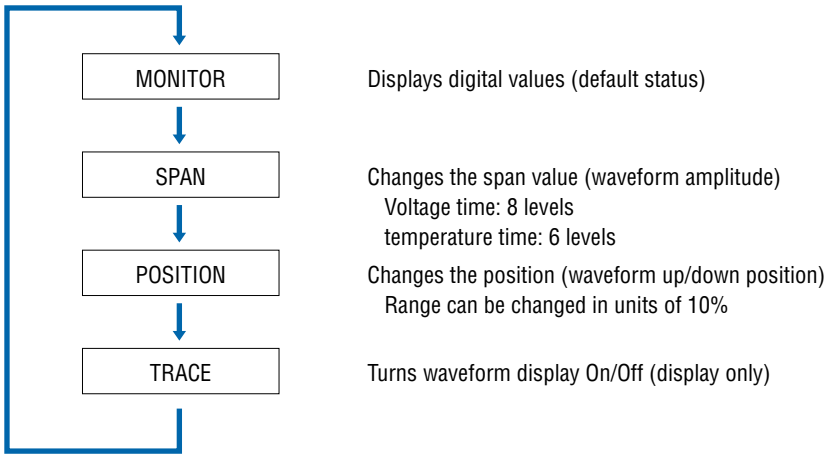
Key Operation

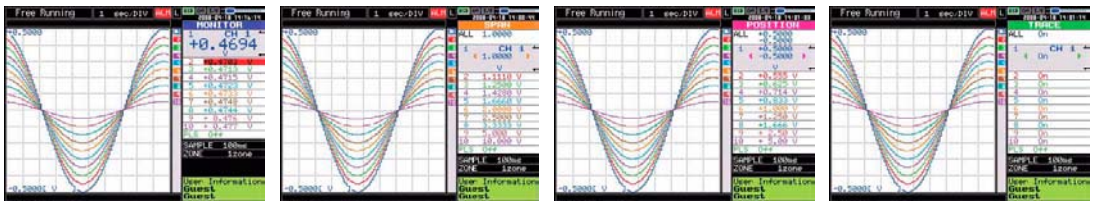
This section describes key operation.



(1) SPAN/POSITION/TRACE

Switches the display in the digital display area. Used to change the status of the input signal displayed in a waveform during Free Running (when stopped), data capture and data replay. ALL reflects the CH1 settings to all other channels.





Setting Procedure

1 **Switch to the item you want to change ([SPAN/POSITION/TRACE] key)**

2 **Adjust to the channel you want to change to (Direction key up/down)**

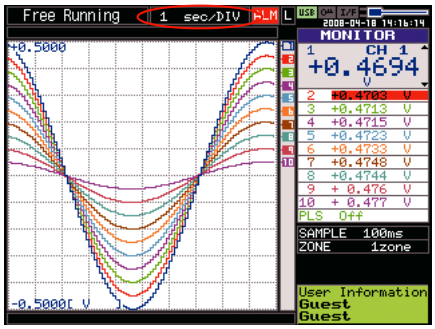
Note

When CH1 is off, All cannot be selected.

3 **Change (Direction key left/right)**

(2) TIME/DIV

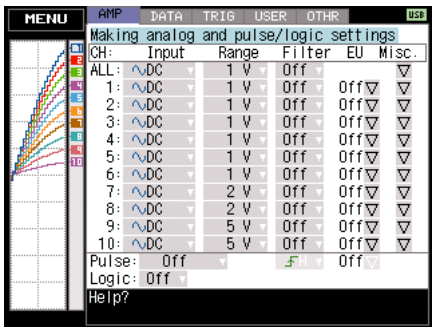
Press the left/right key of the [TIME/DIV] key to change the time axis display width.



(3) MENU

Open the settings window to capture data.

For details on settings, see "Setting Menus" on p.44.



(4) QUIT (LOCAL)

This key is primarily used for the following operations.

- To cancel a setting during menu configuration.
- To return to the MONITOR window when the SPAN/POSITION/TRACE window is displayed.
- To return the Waveform + Digital screen.
- To cancel remote status (in which keys are disabled) through interface control.
- To close the menu screen.
- To quit data replay.
- To return the Enlarged Waveform Screen/Digital + Calculation Display Screen to the Waveform + Digital Screen.

(5) Direction keys

This key is primarily used for the following operations.

- To move a menu or setting item during menu configuration.
- To move the cursor during replay.
- To move the active channel in the Waveform + Digital screen (up/down keys).
- To change the setting of SPAN/POSITION/TRACE (left/right keys).

(6) ENTER

This key is primarily used for the following operation:

- To finalize setting items during menu configuration or open submenus.

(7) FAST FORWARD key (KEY LOCK)

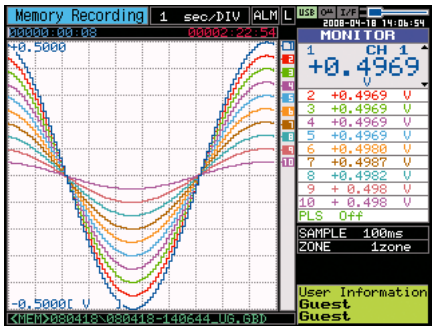
This key is primarily used for the following operations.

- To move the cursor at high speed during replay.
- To change the operation mode in the file box.
- To set key lock. (Hold down the left/right FAST FORWARD key for at least two seconds. Press again to unlock.)

(8) START/STOP (USB Drive Mode)

Press this key to start or stop capture.

- During Free Running, starts capture.
- During capture, stops capture.



- Press the key while turning the power ON to access USB DRIVE Mode.

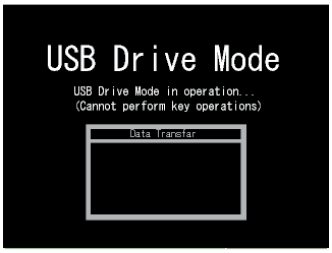
In USB Drive Mode, the internal memory is recognized by the PC as external storage media.

(1) Use a USB cable to connect the ZR-RX20 and a PC.
(When the USB driver has not been installed, install it as described in the software manual "Installing the USB Driver".)

(2) Connect the USB device to the ZR-RX20.

(3) While pressing the ZR-RX20 [START/STOP] key, turn the power ON.

(4) The external storage media is recognized by the PC and data exchange becomes possible.



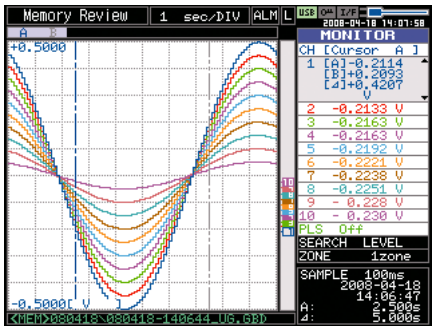
If the USB device is not connected, the internal memory is recognized as the external storage media.

(9) REVIEW

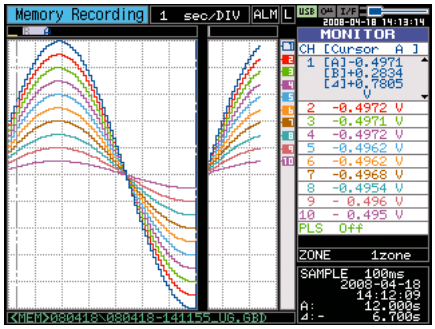
This key is used to replay captured data.

• During Free Running, replays captured data.

The screen used to specify the data replay source file appears; specify the file you want to replay.



• While capturing data, recently captured data is replayed in two windows.

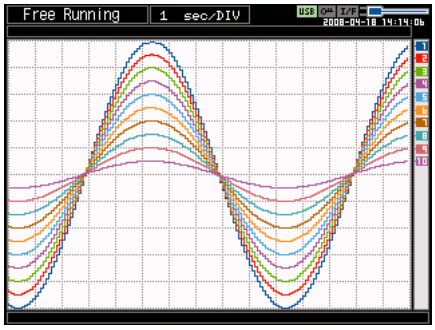


(10) DISPLAY

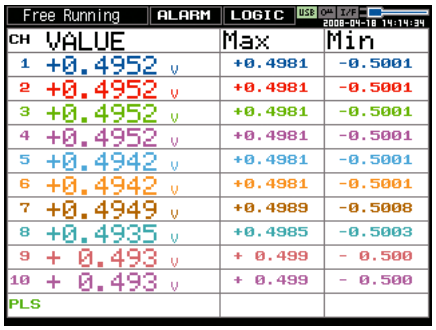
This key is used to switch the window mode.

• "Waveform + Digital" screen: Default

• Expanded Waveform screen: Displays the waveform in full screen mode.

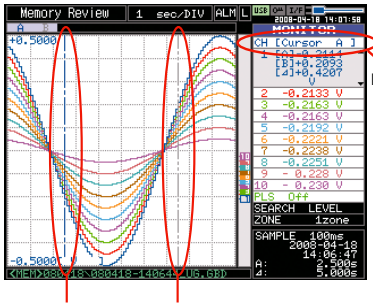


• "Digital + Calculation Display" screen: Displays digital values and calculation results in large text.
(Calculation results are added up in real time.)



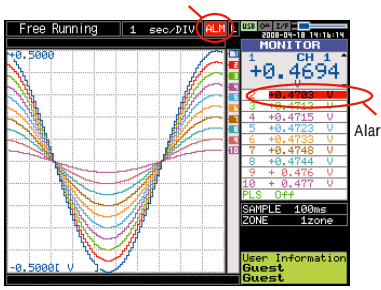
(11) CURSOR (ALARM CLEAR)

• This key is used to toggle between cursors A and B during replay.



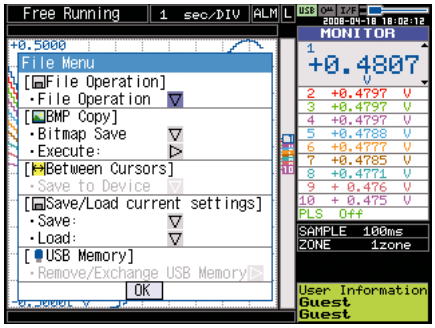
• When the alarm setting is “Hold generated Alarm”, the maintained alarm is cleared.

Alarm output terminal status
(Red = Alarm is issued, Black = Alarm is not issued)



(12) FILE

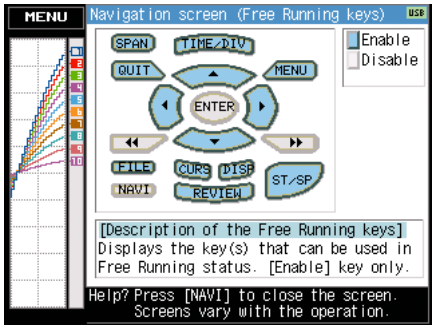
- This key is use for operations related to the Internal memory and USB device (copy and delete).
- Copies the window.
- Saves data between cursor A and cursor B during replay (can be set during replay only).
- Saves or reads the currently set condition into the USB device.
- Used to replace the USB memory device during data capture.



(13) NAVI

This key is used to display the key operation content during Free Running, capture or replay.

During display of the NAVI screen, an explanation of how the key is used is displayed in the window.

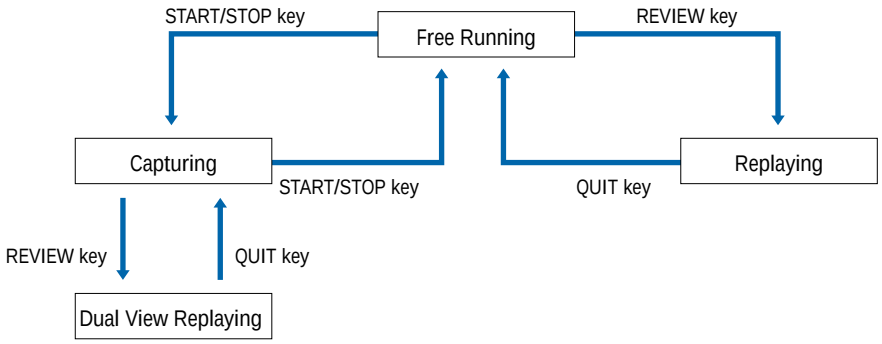


Operation Modes

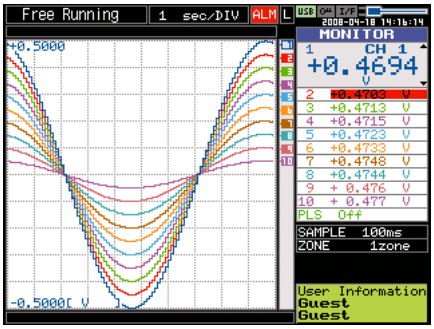
You can check the system operation status in the simplified message display area.

operation	operation	simplified message display
Free Running	Start up status or data is not being captured	Free Running
Capturing	Data is being captured in the main memory or USB device.	Memory Recording USB Drv Recording
Dual View Replaying	The current waveform display and data on capturing is being replayed	Memory Recording USB Drv Recording
Replaying	Captured data is being replayed	Memory Review USB Drive Review

Operation status transition



(1) Free Running



When in Free Running status, you primarily set up the system to capture data.

You can check the current input signal as a waveform or digital values.

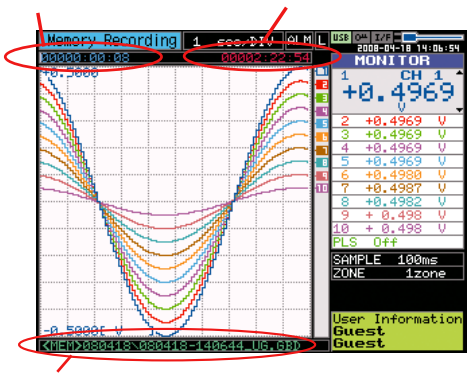
Operations available during Free Running

Measuement parameters settings	The [MENU] key is used to change various setting items in configuration menus.
SPAN/POSITION/TRACE	The [SPAN/POSITION/TRACE] key is used to change settings.
Display mode	The [DISPLAY] key is used to change the display mode.
File operations	The [FILE] key is used to perform file-related operations.
Data replay	The [REVIEW] key is used to replay captured data.

(2) Capturing

Time of Capturing

Capture time
Note: "+++++:++:++" is displayed when the capture time is long.



Capture file name

During data capture, data is captured into the Internal memory or USB device.

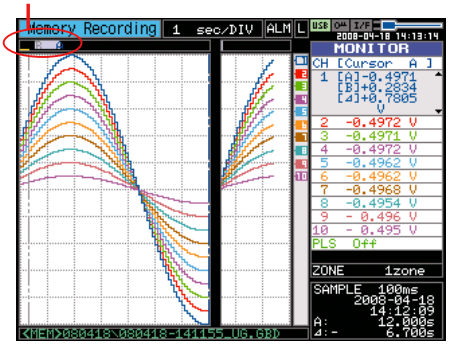
You cannot use the [MENU] key to change the setting.

Operations available during capture

SPAN/POSITION/TRACE	The [SPAN/POSITION/TRACE] key is used to change settings.
Display mode	The [DISPLAY] key is used to change the display mode.
Dual View replay	The [REVIEW] key is used to replay captured data in two windows at the same time.

(3) Dual View Replaying

Screen buffer usage rate



You can replay data during capture.

Waveform on the right side is the current captured data and the left side is previously captured data. You can use the Direction keys (left/right) to move the cursor to captured data to check digital values.

(The waveform can only be displayed for the double window buffer portion.)

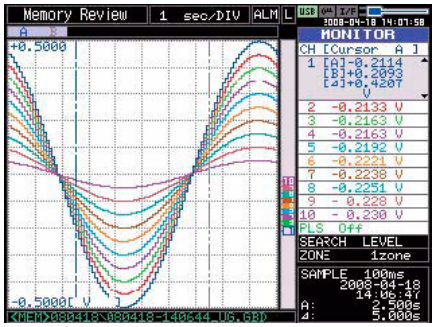
Operations available during dual view replaying

Moving cursor	The [CURSOR] key is used to switch between cursors A and B. The left/right or FAST FORWARD keys are used to move the cursors.

Important

Captured data can be displayed in full. However, the amount of data that can be displayed on a single screen will be limited to the amount of dedicated buffer memory. The buffer memory size is 512 KB.

(4) Replaying



Displays captured data.

Available operation during replaying

SPAN/POSITION/TRACE	The [SPAN/POSITION/TRACE] key is used to change settings.
Menu operations during data replay	The [MENU] key is used to move the cursor, search data and set calculation.
Moving cursors	The [CURSOR] key is used to switch between cursors A and B. The left/right or FAST FORWARD keys are used to move the cursors
File operations	The [FILE] key is used to save the data between the cursors.

Setting Menus

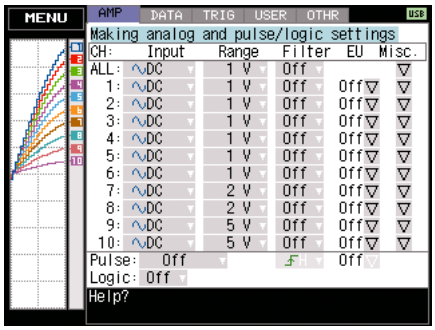
When you press the [MENU] key during Free Running, the following menu screens appear.

The menu screens are classified by the tab for each setting item.

AMP → DATA → TRIG → USER → OTHR

(1) AMP settings

This menu is used to specify input signal-related settings.


MENU
AMP DATA TRIG USER OTHR
Making analog and pulse/logic settings
CH: Input Range Filter EU Misc.
ALL: DC 1 V Off
1: DC 1 V Off Off
2: DC 1 V Off Off
3: DC 1 V Off Off
4: DC 1 V Off Off
5: DC 1 V Off Off
6: DC 1 V Off Off
7: DC 2 V Off Off
8: DC 2 V Off Off
9: DC 5 V Off Off
10: DC 5 V Off Off
Pulse: Off Off
Logic: Off
Help?

Setting		Selections available	Setting method
Input		Off, Voltage, Temperature, Humidity Humidity: (CAUTION: The input range is compulsorily set to 1 V, and the scaling function set to ON. 0V → 0%, 1V → 100%)	ENTER → Select → ENTER
Range		Voltage: 20, 50, 100, 200, 500 mV 1, 2, 5, 10, 20, 50, 1-5 V Temperature: TC-K, TC-J, TC-T, TC-R, TC-E, TC-B,TC-S, TC-N, TC-W	ENTER → Select → ENTER
Filter		Off, 2, 5, 10, 20, 40	ENTER → Select → ENTER
EU (Scaling settings)	Function	Off, On (effective when On has been selected)	ENTER → Select → ENTER
	Lower - Upper Unit	Settings	
		Meas. Value (Upper/Lower)	ENTER → Set numeric value → ENTER
		EU Value (Upper/Lower)	ENTER → Set numeric value → ENTER
		Dec pt	ENTER → Select → ENTER
		Unit	ENTER → Text Input → ENTER
		Select	ENTER → Select → ENTER
Misc.		Span setting (Span All Settings) Annotation setting Zero voltage adjustment • Perform Auto Zero ADJ. • Reset Auto Zero ADJ. [Zero point voltage value]	ENTER → Set numeric value → ENTER ENTER → Text Input → ENTER Press ENTER to execute
Pulse	Mode	OFF, Revol., Counts, Inst.	ENTER → Select → Register
	Slope	H, L	ENTER → Select → ENTER
	EU (Scaling settings)	Function: Off, On • Setting values • Unit select • Unit	ENTER → Select → ENTER ENTER → Set numeric value → ENTER ENTER → Select → ENTER ENTER → Text Input → ENTER
Logic		Off, On	ENTER → Select → ENTER

When you use CH ALL to set an input range and filter, all channels are set to the same settings if the input is the same. Range is set only for the same input CHs.

Span All Settings, is set only for the same range CHs.

Input ..... Selects input condition.

Off : No signal input is accepted.

Voltage : Used for measuring direct-current voltage.

Temperature: Used for measuring temperature.

Humidity : Used for measuring humidity.

Range ..... Specifies the range of signal input to be measured.

Voltage : 20, 50, 100, 200, 500mV, 1, 2, 5, 10, 20, 50, 1-5V

Temperature: TC-K, TC-J, TC-T, TC-R, TC-E, TC-B, TC-S, TC-N, TC-W

The available SPAN settings differ according to the measurement range.

The relationships between the measurement range and SPAN are as shown in the following chart.

<Voltage Ranges>

Range	Maximum SPAN		Minimum SPAN	
	Lower to Upper SPAN [mV]	Lower to Upper SPAN [V]	Upper SPAN minus Lower SPAN	
1		–1.1000 to +1.1000		10 mV
2		–2.2000 to +2.2000		20 mV
5		–5.500 to +5.500		50 mV
10		–11.000 to +11.000		100 mV
20	–22.000 to +22.000	–22.000 to +22.000	0.2 mV	200 mV
50	–55.00 to +55.00	–55.00 to +55.00	0.5 mV	500 mV
100	–110.00 to +110.00		1.0 mV	
200	–220.00 to +220.00		2.0 mV	
500	–550.0 to +550.0		5.0 mV	

<Temperature Ranges>

Range	Maximum SPAN	Minimum SPAN
	Lower to Upper SPAN	Upper SPAN minus Lower SPAN
K	–200.0 to +1370.0	50°C
J	–200.0 to +1100.0	50°C
T	–200.0 to +400.0	50°C
R	0.0 to +1600.0	50°C
E	–200.0 to +800.0	50°C
B	600.0 to +1820.0	50°C
S	0.0 to +1760.0	50°C
N	0.0 to +1300.0	50°C
W	0.0 to +2315.0	50°C

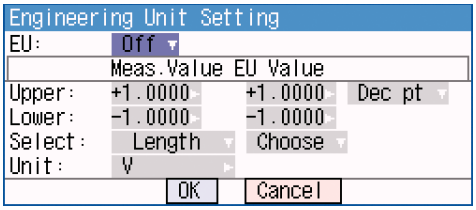
<Humidity Range>

Range	Maximum SPAN	Minimum SPAN	Minimum Resolution
K	0 to +110%	1.0%	0.1%

The SPAN cannot be changed.

Filter..... Sets the filter status. Filter operation is on a moving average basis.
Off, 2, 5, 10, 20, 40 times

EU (Scaling)..... Scales the measured values and converts them to other units.



(1) EU
Sets the scaling function to Off or On.

(2) Meas. Value
Specifies the numeric value to be converted. Set two points, the Upper and Lower parameters.

(3) EU Value
Specifies output after conversion. Set two points, the Upper and Lower parameters.

(4) Dec pt
This parameter specifies the decimal point position of the numeral to be specified as the EU value(s).

(5) Unit
Selects the converted unit, which can be specified as a userdefined character string consisting of alphanumerics. The Unit parameter can also be specified by selecting the Select Unit setting.

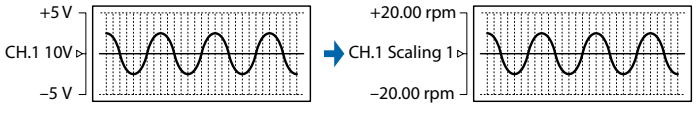
(6) Select
Selects the type of engineering unit.

(7) Choose
Selects the converted unit. The Unit displayed here is the type of unit selected by the Select setting.

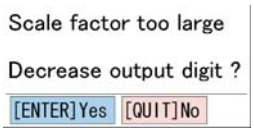
To specify a unit that is not displayed here, specify a user-defined character string as the Unit setting. Moreover, the setting specified here is displayed as the Unit setting.

Setting Example

	Upper Value	Lower Value
Specified Value	+5.00	–5.00
EU Value	+20.00	–20.00



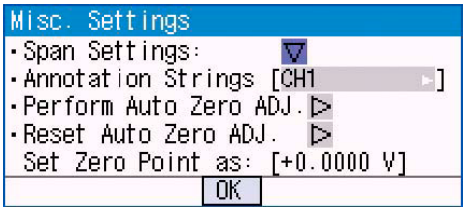
If this message appears, follow the instructions by reducing the number of digits to be output by one, or leaving the number of digits as is and changing the EU value.



Note

The Scaling operation is calculated using a ratio of the Meas. Value or EU Output Value settings. If a ratio value that the ZR-RX20 cannot process is specified, the message below appears.

Misc..... Sets other settings.



(1) Span Settings
Sets the detailed span for each channel.

(2) Annotation Strings
Sets a comment for each channel.

For details on user setting, see “Text input” on p.65.

(3) Perform Auto Zero ADJ
Moves the current input voltage to zero position voltage value.

(4) Reset Auto Zero ADJ
Cancels the zero position voltage value and displays input voltage.

Pulse ..... Performs data processing such as revolution, count and inst. on signals connected to the pulse input terminal.

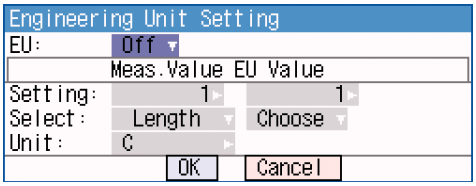
Modes: Select from Off, Revolutions, Counts, and Inst.

- Off: Input is disabled.
- Revolution : Counts the number of pulses per second and displays the values multiplied by 60 as rpm values.
- Counts : Displays the cumulative number of pulses for each sampling interval from the start of measurement.
- Inst. Displays the number of pulses for each sampling interval.

Slope Sets the condition for the input signal operation.

- H : Operates when the signal is rising.
- L : Operates when the signal is falling.

EU (Scaling) Scales and converts the measured value.

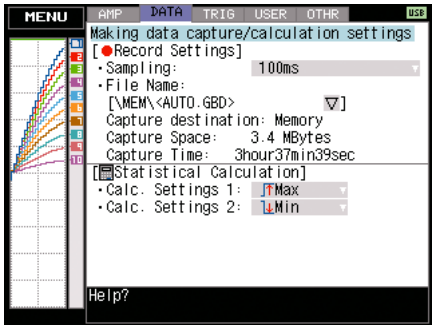


- Meas. Value : Specifies the numeric value to be converted.
- EU Value : Specifies output after conversion.
- Unit : Selects the converted unit, which can be specified as a user-defined character string consisting of alphanumerics. The Unit parameter can also be specified by selecting the Select Unit setting.
- Select : Selects the type of engineering unit.
- Choose : Selects the converted unit. The Unit displayed here is the type of unit selected by the Select Unit setting.

Logic ..... Setting of logic input: Off (disabled), On (enabled).

(2) DATA settings

This menu is used to specify capture-related items and calculations.



DATA Menu Structure

Setting	Selections available	Setting method
Record Settings • Sampling Interval	100, 200, 500ms 1, 2, 5, 10, 20, 30s 1, 2, 5, 10, 20, 30min, 1h * 50 ms or below can be selected under conditions indicated in the table below.	ENTER → Select → ENTER
File Name	File: Folder name, file name	ENTER → Select → ENTER
	Name Type: Auto, User	ENTER → Select → ENTER
	File Type: GBD, CSV	ENTER → Specify file → OK
Statistical Calculation • Calculation Settings 1, 2	Off, Average, Max, Min, Peak, RMS	ENTER → Select → ENTER

Important

When you save files, create a folder and then save the files in the folder. Regardless of the remaining capacity, if you try to save files in the root directory, due to file restrictions you may not be able to save files.

Sampling Interval ..... Specifies the sampling interval for data capture.

The table below shows the number of measuring channels and sampling interval values that can be set.

If data fluctuate due to noise, set the sampling interval to a value which enables the digital filter function.

Number of Measuring Channels*1	Allowed Sampling Interval	Sampling Interval which enables Digital Filter
1 channel	10 ms or above*2	50 ms or above
2 channels or less	20 ms or above*2	125 ms or above
5 channels or less	50 ms or above*2	250 ms or above
10 channels or less	100 ms or above	500 ms or above

*1 Number of Measuring Channels indicates the number of channels in which input settings are NOT set to “OFF”.
*2 Temperature cannot be measured when the sampling interval is set to 10, 20, or 50 ms.

Captured data file name..... Select the name of a file to which you want to save captured data.

Set either the main memory or USB device (option).

See "File box" on p.62.

Name Type..... Set how the file is named.

• Auto: Automatically uses the capture start time as the file name.

Example: 20050101-123456_UG.GBD

• Number part: Created on January 1, 2005, 12: 34:56.

• UG part: Number of user capturing data

UG: Guest

U1: User 1

U2: User 2

For details on user setting, see “(4) USER settings” on p.56.

• User: Captures data using a user-defined name.

File Format..... Set the file format in which data is saved.

• GBD: Binary format

• CSV: CSV file format

Statistical calculation..... Two types of operation can be performed on all channels.

Operation results are displayed on the "Digital + Calculation Display" screen.

• Off: Calculation is not performed.

• Average: Displays the simple average value during data capture.

• Max: Displays the maximum value during data capture.

• Min: Displays the minimum value during data capture.

• Peak: Displays the peak value data during data capture.

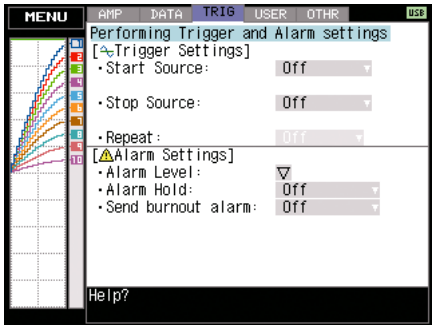
• RMS: Displays the effective value of the data during data capture.

$$R.M.S = \sqrt{\Sigma D^2/n}$$

D: data n: number of data

(3) TRIG settings

This menu is used to specify trigger conditions and alarms.



Setting	Selections available	Setting method
Start side source setting	Off	ENTER → Select → ENTER
	Level	ENTER → Setting menu
	External Input	ENTER → Select → ENTER
	Date	ENTER→ Setting menu
Stop side source setting	Off	ENTER → Select → ENTER
	Level	ENTER → Setting menu
	External Input	ENTER → Select → ENTER
	Date	ENTER → Setting menu
	Time	ENTER → Setting menu
Repeated capturing	On, Off	ENTER → Select → ENTER
Alarm level settings		ENTER → Setting menu
Alarm Hold	On, Off	ENTER → Select → ENTER
Send burnout alarm	On, Off	ENTER → Select → ENTER

Start side source settings..... Specifies conditions to start data capture.

- Off: Starts capturing data unconditionally.
- Level: Starts capturing data when a specified level is reached.
- External Input: Starts capturing data when an input signal is received from an external trigger terminal.
- Date : Starts capturing data when a specified time arrives

  (when repeated capturing is set to Off)

  : Starts capturing data when a specified time arrives

  (when repeated capturing is set to On)

  This setting is used when you want to start capturing data at the same time every day.

Stop side source settings..... Specifies conditions to stop data capture.

- Off: Does not stop data capture by a trigger.
- Level: Stops data capture when the specified level is reached.
- External Input: Stops capturing data when an input signal is received from an external trigger terminal.
- Date : Stops capturing data when a specified time arrives

  (when repeated capturing is set to Off).

  : Stops capturing data when a specified time arrives

  (when repeated capturing is set to On).

  This setting is used when you want to stop capturing data at the same time every day.
- Time : Stops capturing data at a specified time after starting data capture.

Repeated capturing..... After a stop side trigger is generated, the next data capture process begins.

- Off: Does not repeat data capture.
- On: Repeats data capture.

Alarm level settings..... When the setting level conditions are met, the alarm output terminl outputs an alarm.

The channel for which the alarm has been generated is displayed in red on the Digital screen.

Alarm Hold ..... Specifies whether or not to maintain the alarm status when an alarm is generated and then canceled.

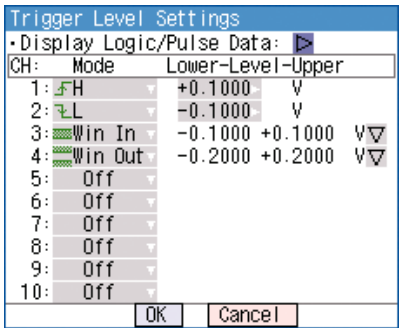
- Not Maintained: Alarm status is canceled when the alarm is canceled.
- Maintained: Alarm status is not canceled even though the alarm is canceled.

Send burnout Alarm ..... When burnout occurs, an alarm signal is output to the alarm output terminal.

See on p.58

- Does not occur: Alarm signal is not output to the alarm output terminal when burnout occurs.
- Occurs: Alarm signal is output to the alarm output terminal when burnout occurs.

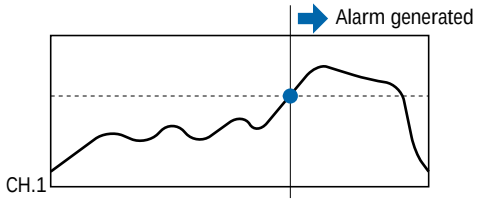
Trigger level settings/Alarm level settings



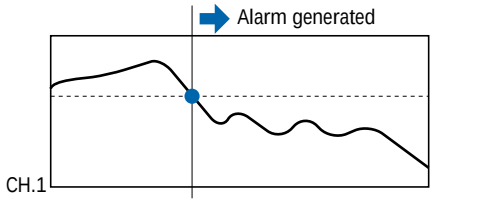
Mode ..... Specifies mode trigger/alarm output conditions.

Off: Does not enable trigger/alarm.

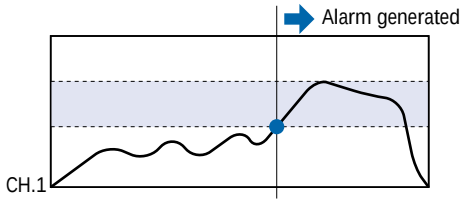
H : An alarm is generated when the signal input rises to (or exceeds) the specified alarm level.



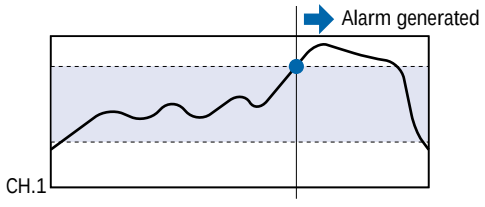
L : An alarm is generated when the signal input falls to (or falls below) the specified alarm level.



Win In : Used to specify the upper and lower alarm limits for each channel. When the signal level goes within (or is within) either limit, an alarm is generated.

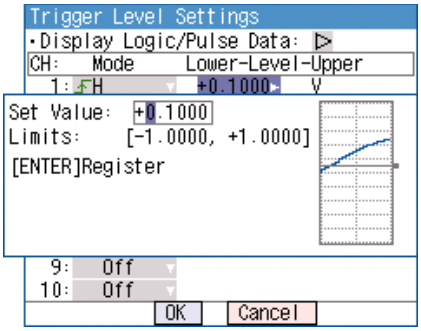


Win Out : Used to specify upper and lower alarm limits for each channel. When the signal level goes outside (or is outside) either limit, an alarm is generated.

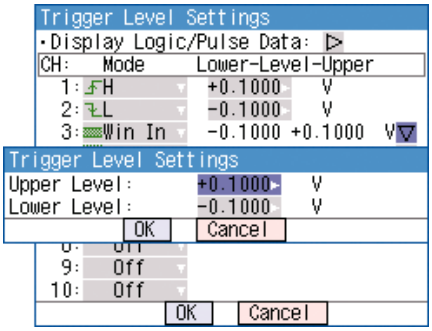


Lower - Level - Upper ..... Specifies the trigger/alarm level(s) for the conditions set in Mode.

• H, L: Input a numeric value.



• Win In, Win Out: Input a numeric value for the upper and lower limit.



Pulse

Specifies the trigger/alarm for pulse input signals.

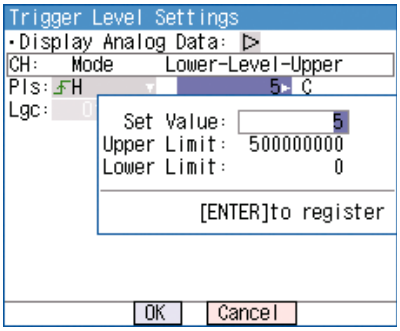
These conditions can be set when they have been enabled in the AMP settings.

Mode ..... Specifies the same conditions as for analog CH conditions.

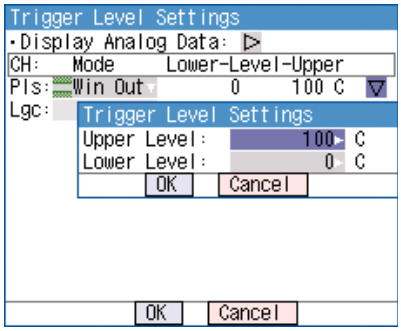
See on p.53

Lower - Level - Upper ..... Specifies the trigger/alarm level(s) for the conditions set in Mode.

• H, L: Input a numeric value



• Win In, Win Out: Input numeric values for the upper and lower levels.



Logic

Sets the trigger/alarm conditions for logic input.

These conditions can be set when they have been enabled in the AMP settings.

• Off: No trigger (alarm) conditions set.

• L: Trigger (alarm) is generated when logic signal is Low.

• H: Trigger (alarm) is generated when logic signal is High.

(4) USER settings

The USER settings menu is used to store user-specific settings and conditions. Each set of settings can be called up easily by simply switching the user.

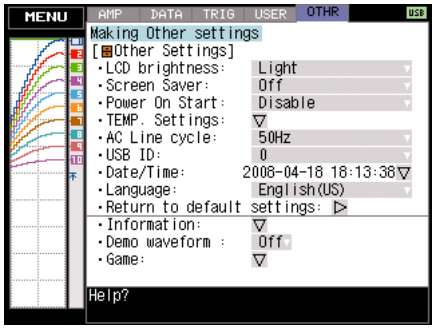
This menu is used to specify the user name and switches user setting conditions.

You can specify that the user is a Guest, User 1 or User 2.

- User: Specify the user name. You cannot specify it as Guest.
- Department name: Specify the department name. You cannot specify it as Guest.
- Setting condition switch: Switches between Guest, User 1 and User 2. Since setting conditions are stored for each user, they can be called up easily by simply switching the user.

(5) OTHR settings

Other miscellaneous settings are made here.



Setting		Selections available	Setting method
LCD brightness		Light, Medium, Dark	ENTER → Select → ENTER
Screen Saver		Off, 10, 30 (sec.), 1, 2, 5, 10, 30, 60 (min.)	ENTER → Select → ENTER
Power On Start		Disable, Enable	ENTER → Select → ENTER
TEMP. Settings	Room Temp. Compensation	Internal, External	ENTER → Select → ENTER
	Temp. Unit	°C, °F	ENTER → Select → ENTER
	Burn Out	Off, On	ENTER → Select → ENTER
AC Line cycle		50/60Hz (Off, On)	ENTER → Select → ENTER
USB ID		0~9	ENTER → Select → ENTER
Date/Time		Date, time settings	ENTER → Setting menu
Language		Japanese, English (US), English (UK), French, German, Chinese, Korean	ENTER → Select → ENTER
Return to default settings			ENTER
Information		Firmware version System Control	
Demo Waveform Mode		Off, On	ENTER → Select → ENTER
Game		Memory test game Number order game Reversi	ENTER

LCD brightness ..... Adjusts the brightness of the LCD backlight. When the battery is used, dimming the LCD extends battery life.

Screen Saver ..... Turns off the display if the ZR-RX20 is not operated within a specified interval, thus extending battery life.

Power On Start..... Initiates measurements as soon as the ZR-RX20 is turned on.

- Disable: Disables the Power On Start function.
- Enable: Enables the Power On Start function.

Room Temp. Compensation .. This parameter enables room temperature compensation settings when thermocouples are used. You can select either internal or external room temperature compensation.

- Internal: The ZR-RX20's room temperature compensation settings are used

(usually, you use this parameter).

- External: Select this parameter when measuring compensation other than that of the ZR-RX20.

Temp. Unit..... Toggles the temperature unit between °C and °F.

- °C: Celsius
- °F: Fahrenheit (the scaling function is compulsorily enabled)

Burn Out..... This parameter enables or disables a function that moves to full scale to inform of a sensor burnout in a thermocouple.

- Off: Disables burnout function.
- On: Enables burnout function.

AC Line Frequency ..... Select the appropriate frequency for the AC line used.

- 50Hz: For areas using line frequency of 50 Hz
- 60Hz: For areas using line frequency of 60 Hz

This setting specifies the frequency in which noise can be eliminated with the digital filter function.

Refer to page p.49 for details on sampling speeds that enable the digital filter function.

USB ID ..... Sets the ZR-RX20's USB ID number.

Select from 0 to 9.

Make sure you set each device with a unique ID number when controlling multiple ZR-RX20 from a single computer.

You must restart ZR-RX20 after any change is made to a setting value.

Changes are applied upon restart.

Date/Time ..... This parameter sets the date and time.

Language..... This parameter sets the ZR-RX20's display language.

Return to default settings..... Returns all the settings to the factory defaults.

Information..... Displays system information.

Demo Waveform Mode ..... This parameter displays demo waveforms without analog signal input.

Triangular waveforms, rectangular waveforms and noise are displayed in order.

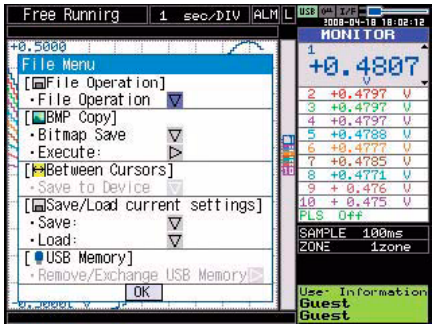
You can capture and replay demo waveforms.

- Off : Do not display demo waveforms.
- On : Display demo waveforms.

Game ..... Three games are available. The score is stored for each user.

(6) Other menus

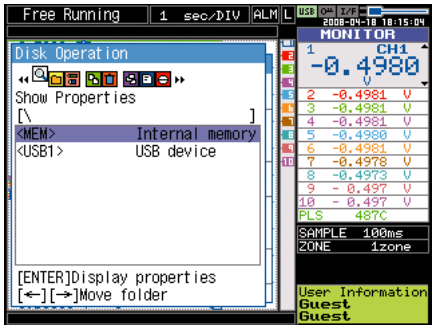
FILE



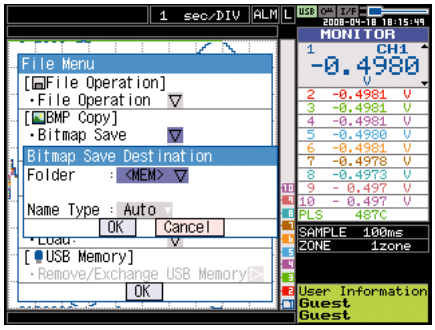
This menu is used to perform file-related operations.

- File Operation — Operate files in the main memory and USB device.

For details on file operation, see on p.62.



- BMP Save — Saves a copy of the screen as a BMP file.



- Folder/File: — Specify a folder when the Name Type is set to Auto.
  Specify a file name when the Name Type is set to User.
- Name Type — Specifies how files are named.
  - Auto: Automatically uses the capture start time as the file name.
  - User: Sets to a user-defined name.
- Execute: — Executes bitmap save.

• Save Data Between Cursors When captured data is replayed, the data between cursors A and B is saved.

  • Folder/File: Specify a folder when Name Type is set to Auto.
    Specify a file name when the Name Type is set to User.

  • File Format: Specifies the file format used to save data.

    • GBD: Binary format

    • CSV: CSV file format (such data cannot be replayed with the ZR-RX20)

  • Name Type: Specifies how to name a file.

    • Auto: Automatically uses the capture start time as the file name.

    • User: Sets to a user-defined name.

• Save current settings/Load settings Saves or loads main unit condition settings.

  • Folder/File: Specify a folder when Name Type is set to Auto.
    Specify the file name when the Name Type is set to User.

  • File Format: Specifies the file format used to save data.

    • GBD: Binary format

    • CSV: CSV file format (such data cannot be replayed with the ZR-RX20)

  • Name Type: Specifies how to name a file.

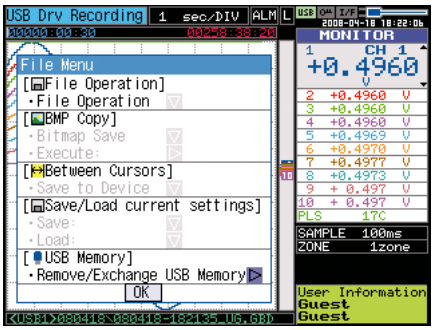
    • Auto: Automatically uses the capture start time as the file name.

    • User: Sets to a user-defined name.

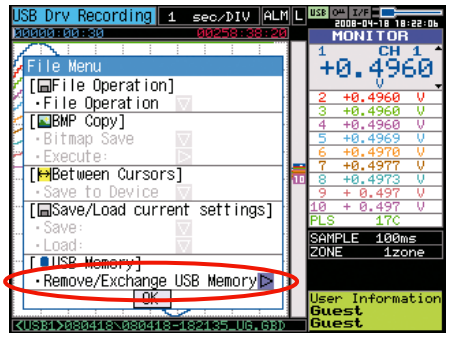
• USB Memory The USB memory device can be removed and replaced during data capture.
Follow the procedures below to replace the device.

<Operation example when USB thumb drives are exchanged detaching>

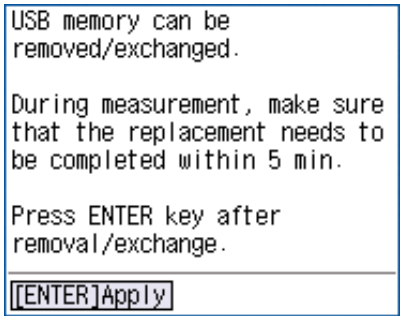
1 Press the [FILE] key to open the FILE menu.

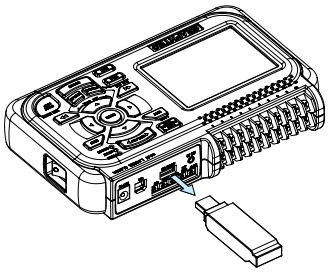


2 Move the cursor to Remove/Exchange USB Memory and press the [ENTER] key.

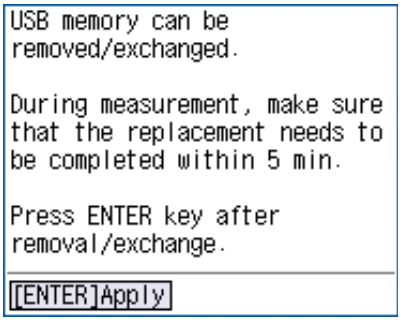


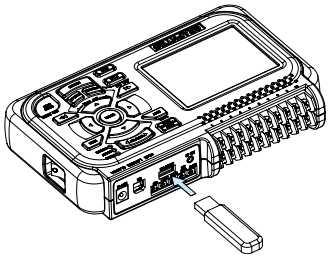
3 **You can remove the USB memory device when the message is displayed.**





4 **Insert a new USB memory device.**





5 **Press the [ENTER] key.**

Note

"_CHG" and a number will be appended to the file name each time you exchange a USB memory device.

Ex) When data is captured to file "TEST.GBD":
First USB memory device: TEST.GBD
Second USB memory device: TEST_CHG1.GBD
Third USB memory device: TEST_CHG2.GBD

Important

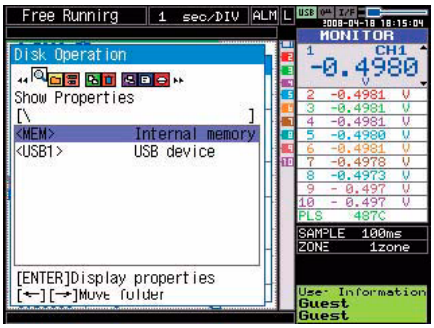
The exchange procedure must be conducted within five minutes.

Data will be lost when five minutes have elapsed.

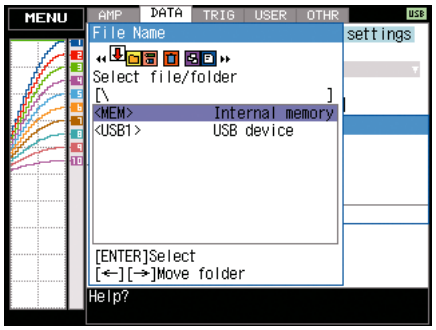
File box

The file box used to set captured data files using the DATA menu or for disk operations accessed using the FILE menu is operated as follows.

<File box by disk operations>



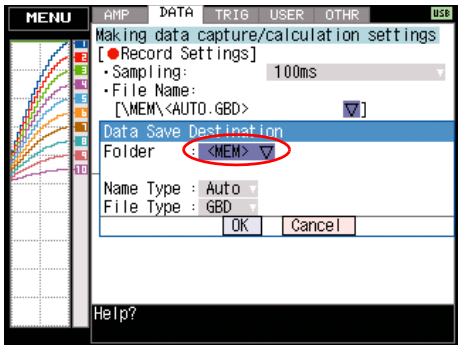
<File box using the DATA menu>



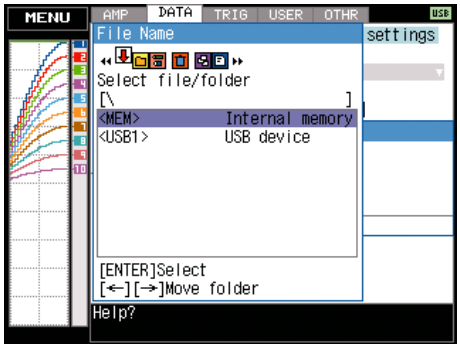
Key	Description
◁◁ ▷▷	Change the operation of the file box. Show properties ..... Display details of a file or folder. Select file/folder..... Select files or folders to write data. Create new folder..... Create a new folder. Create new file ..... Create a new file. Rename..... Change the file or folder name. Copy file/folder ..... Copy files or folders. Select file to copy/delete ..... Select the file to copy or delete. Select copy destination and copy... Select the copy destination and copy. Delete file/folder ..... Delete files or folders. Change file sort order..... Change the order in which files are displayed. View setting..... Change displaying information for files. Format disk ..... Format the disk. * Details of allowed operation will depend on the operation target.
◁▷	Moves between folders. ◁ : Move up one folder. ▷ : Move down one folder.
ENTER	Finalize the operation.
QUIT	Close the file box.

<Setting example>

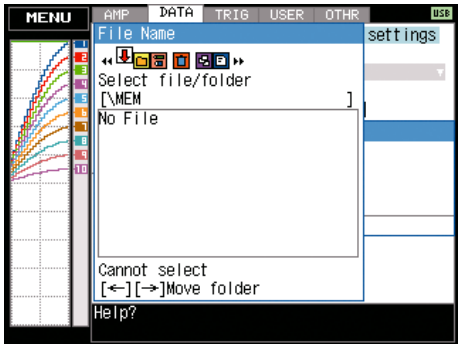
The following shows an operation example where a folder named "TEST" is created for captured data and automatically saved.



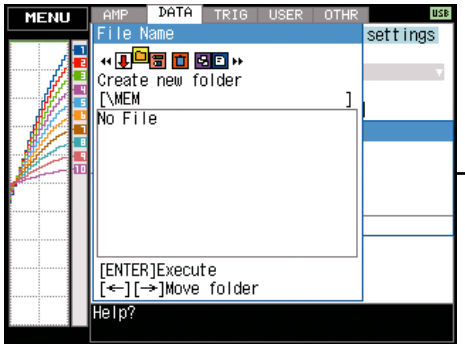
In the [Data save Destination], choose [Select folder] and press the [ENTER] key.



Use the ▷ key to move to the target folder.

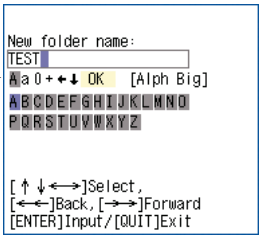


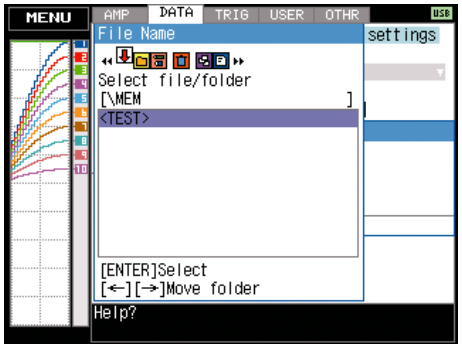
Use the ▷▷ key to select [Create new folder].



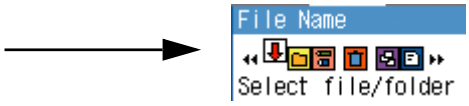
Press the [ENTER] key.

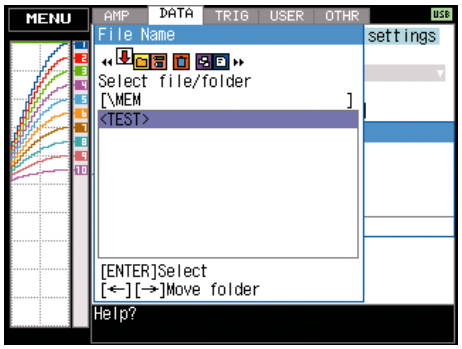
In the [New folder name] box that appears, type in "TEST".



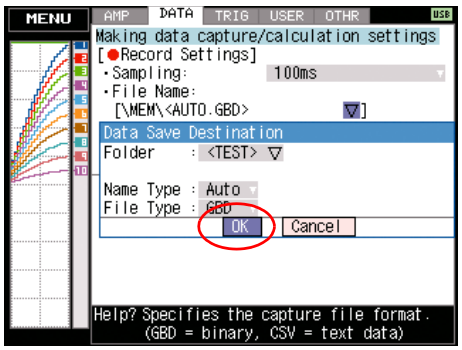


Use the ◁◁ key to choose [Select file/folder].





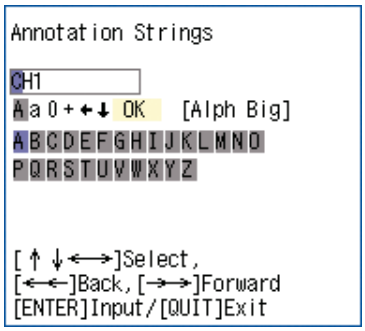
Use the ▽△ key to move the cursor to the created "TEST" folder, and press the [ENTER] key.



Select [OK] to close the screen.

Text input

Related to text input operations such as annotation, EU (scaling) unit and captured data file name input.

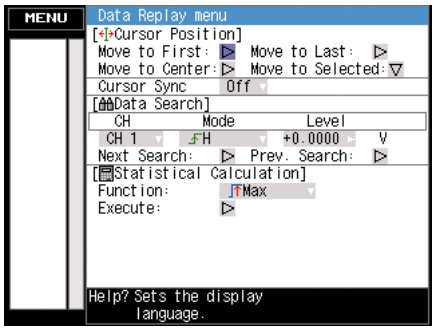


• Operation

Operation mode	Description		Operation method
Text input	A	Upper case alphabet mode	When the cursor key is moved to the uppermost part, operation can be selected using the left/right key. After selecting an operation, use the down key to move the cursor to the desired character.
	a	Lower case alphabet mode	
	0	Numeric mode	
	←	Symbol mode	
	↓	Delete mode	
	-	Insert mode	
	OK	Finalize mode	
When selecting operation	Text used for each operation		When you bring the cursor to a character and press ENTER, the character is entered. After you finish entering characters, move the cursor to OK and then press ENTER.

Data replay menu

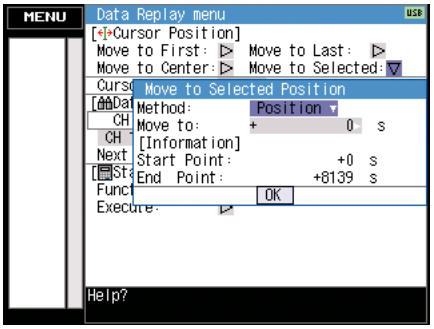
Data replay menus are displayed by pressing the [MENU] key during replay.



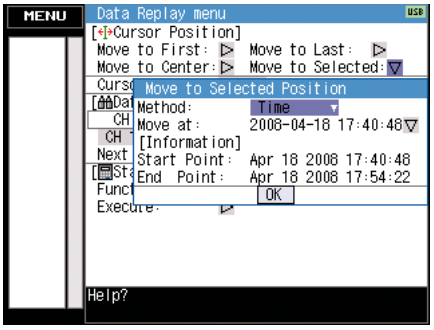
Setting	Selections available	Setting method
Cursor Position Move to First Data		ENTER
Move to Last Data		ENTER
Move to Center		ENTER
Move to Selected Position	Method : Position, Time Move to :(Position only) Upper limit, Lower limit :(Time only) Specified time	ENTER → Select → ENTER ENTER → Input numeric value → ENTER ENTER → Input numeric value → ENTER
Cursor Sync	Off, On	ENTER → Select → ENTER
Date Search	CH1-CH10, Pulse, Logic, Alarm	ENTER → Select → ENTER
	• Mode Analog: H, L Pulse: H, L Logic: H, L Alarm: Both, H, L • Level (only for analog and pulse)	ENTER → Select → ENTER ENTER → Input numeric value → ENTER
Next Search		ENTER
Prev. Search		ENTER
Statistical Calculation	Off, Average, Max, Min, Peak, RMS	ENTER → Select → ENTER
Execute		ENTER

Cursor Position ..... There are other functions for Cursor Move apart from the Alarm search function.

- Move to First Data: Moves the cursor to the start of the data.
- Move to Last Data: Moves the cursor to the end of the data.
- Move to Center: Moves the cursor to the center of the data.
- Move to Selected Position: Specify the cursor position to be moved to.
  - Position: Move at the specified time from the start of measurement. Interval until the end of measurement, in 0.1-s units



- Time: Move to the specified date/time.



Cursor Sync ..... Moves cursors A and B simultaneously. Cursor A is always the fulcrum.

Date Search ..... This function searches within the captured data using the specified method.

- CH: Select the channel you want to search.
- Mode: Select the mode used for search. The setting is changed depending on the searched channel.

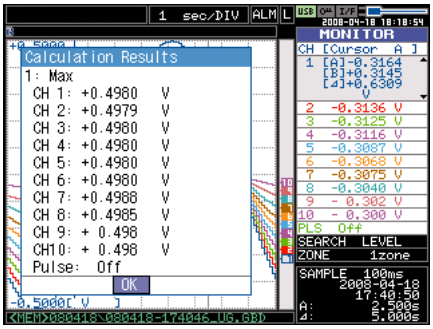
  (For analog CH, pulse, and logic)

  - H: Operates when the searched data rises to a specified level.
  - L: Operates when the searched data falls to a specified level.

  (For alarm)

  - Both: Operates when a searched alarm is generated or canceled.
  - H: Operates when a searched alarm is generated.
  - L: Operates when a searched alarm is canceled.
- Level: Sets the level to be searched for analog CH and pulse.

Statistical calculation between cursors : Statistical calculation is performed on the databetween the cursors.



- Function: There are five types of between-cursor calculation functions and one of these can be selected.

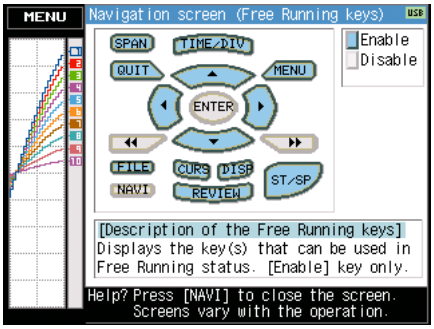
For details of each function, see on p.49.

NAVI menu

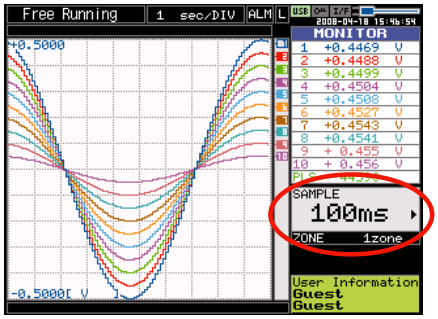
The NAVI menu can be displayed in three modes, Free Running, Recording, and Replay.

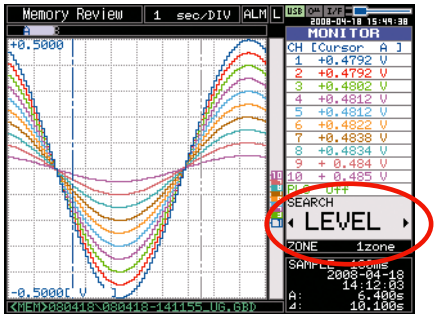
Available key operations for the NAVI menu are explained below.

Operation	Description
Open	Press the [NAVI] key to open the NAVI menu.
Close	Press the [NAVI] key to close the NAVI menu.
Browse explanation	Explanation is displayed when an enabled key is pressed.



Quick settings





You can easily set two items on the digital area of the Waveform + Digital screen.

To set items, use the up/down key to go to the Quick setting area.

Content differs depending on the operation mode.

Operation mode	Content	Explanation
Free Running	SAMPLE	Left/right key can be used to change the sampling interval.
	ZONE	Left/right key can be used to change the zone division.
Recording	ZONE	Left/right key can be used to change the zone division.
Replaying	SEARCH	Left/right key can be used to perform search. Left: Searches past side Right: Searches future side
	ZONE	Left/right key can be used to change the zone division.

MEMO

SPECIFICATIONS

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Standard Specifications

Item				ZR-RX20A	
Analog input section	Input method			Photo MOS relay scanning system; all channels isolated, balanced input	
	Input terminal shape			M3 screw type terminal	
	Number of channels			10 ch	
	Scan speed			10ms/1ch max. (100ms/10ch)	
	A/D resolution			16-bit	
	Measurement ranges	Voltage		20, 50, 100, 200, 500 mV, 1, 2, 5, 10, 20, 50 V, 1-5V F.S.	
		Temperature		Thermocouples: K, J, E, T, R, S, B, N, W (WRe5-26)	
		Humidity (*1)		0 to 100 % (Voltage 0 to 1 V scaling conversion)	
	Measurement accuracy (*2) (*3)	Voltage		±0.1 % of F.S.	
		Thermocouple	Type	Measurement Temperature Range (°C)	Measurement Accuracy
			R/S	0 ≤ TS ≤ 100	±5.2 °C
				100 < TS ≤ 300	±3.0 °C
				R: 300 < TS ≤ 1600 °C	±(0.05 % of rdg +2.0 °C)
				S: 300 < TS ≤ 1760 °C	±(0.05 % of rdg +2.0 °C)
			B	400 ≤ TS ≤ 600	±3.5 °C
				600 < TS ≤ 1820 °C	±(0.05 % of rdg +2.0 °C)
			K	–200 ≤ TS ≤ –100	±(0.05 % of rdg +2.0 °C)
				–100 < TS ≤ 1370 °C	±(0.05 % of rdg +1.0 °C)
			E	–200 ≤ TS ≤ –100	±(0.05 % of rdg +2.0 °C)
				–100 < TS ≤ 800 °C	±(0.05 % of rdg +1.0 °C)
			T	–200 ≤ TS ≤ –100	±(0.1 % of rdg +1.5 °C)
				–100 < TS ≤ 400 °C	±(0.1 % of rdg +0.5 °C)
			J	–200 ≤ TS ≤ –100	±2.7 °C
				–100 < TS ≤ 100	±1.7 °C
				100 < TS ≤ 1100 °C	±(0.05 % of rdg +1.0 °C)
			N	0 ≤ TS ≤1300 °C	±(0.1 % of rdg +1.0 °C)
			W	0 ≤ TS ≤ 2315 °C	±(0.1 % of rdg +1.5 °C)
		Reference contact compensation accuracy		±0.5 °C (23 °C±2 °C, when the input terminal temperature is balanced)	
	Maximum input voltage			Between +/- terminals: 60 Vp-p Between each input channel and GND: 60 Vp-p Between each input channels: 60 Vp-p	
	Reference contact compensation			Internal/External switching	
	Input impedance			1 MΩ ±5 %	

Item			ZR-RX20A
Analog input section	Allowable signal source resistance		300 Ω or less
	Temperature coefficient		Gain: 0.01 % of F.S./°C Zero(*4): 0.02% of F.S./°C
	Common mode rejection ratio		At least 90 dB (50/60 Hz; signal source 300 Ω or less)
	Noise		At least 48 dB (with +/– terminals shorted)
	Withstand voltage		Between each input channel and GND: 1 minute at 350 Vp-p Between each input channels: 1 minute at 350 Vp-p
	Insulation resistance		Between each input channel and GND: 50 MΩ or above (at 500 VDC)
External Input/ Output Sections	Logic input	Number of channels	1 ch
	Pulse input	Number of channels	1 ch
		Modes	Revolutions mode, Counts mode, Inst. Mode switch method
		Maximum number of pulse inputs	Counts, Inst. Modes: 50 k/sec Revolutions mode: 50 k/sec
	Trigger input	Number of channels	1 ch
	Specifications of each input section	Maximum input voltage	24 V
		Threshold voltage	Approx. 2.5 V
		Hysteresis range	Approx. 0.5 V (2.5 to 3 V)
	Alarm output	Number of channels	1 ch
		Output format	Open collector output (100 kΩ pull-up resistance)
		Output conditions	Level judgment, window judgment, logic pattern judgment, pulse judgment
	PC I/F		USB 1.1
Internal memory devices	Internal memory		Approx. 3.5 MB
Operating environment			0 to 40 °C, 30 to 80 % RH (15 to 40 °C when the battery is used)
Power supply			AC adapter: 100 to 240 VAC/50 to 60 Hz (*5) DC input: 8.5 to 24 VDC Battery pack (ZR-XRB1) (*6)
Power consumption			28 VA or less (when the AC adapter is used)
External dimensions			194 × 122 × 41 mm
Weight			Approx. 480 g (*7)

*1 When ZR-XRH1 (Option) is used
*2 Features under the following measurement parameters
- Operating environment 23 °C ± 5 °C
- Left for at least 30 minutes after the power supply is turned on
- Sampling interval 1 s (10 ch)
- Filter ON (Average: 10 times)
- GND connection
- Thermocouple used is T: 0.32∅, other: 0.65∅

*3 Refer to the ZR-XRH1 (Option) specifications for humidity measurement accuracy.
*4 Occurs when sampling speed is 10, 20, or 50 ms.
*5 Be sure to use only the AC cable and the AC adapter provided as standard accessories.
*6 ZR-XRB1 is an option
*7 Excluding the AC adapter and battery

Main Functions

Main unit specifications			ZR-RX20A
Sampling interval(*1)			10, 20, 50, 100, 125, 200, 500 ms; 1, 2, 5, 10, 20, 30 s; 1, 2, 5, 10, 20, 30 min; 1 h
Filter (*2)			Off, 2, 5, 10, 20, 40 times
Trigger Functions	Repeat Trigger		Off/On
	Trigger types		Start: Data capture starts when a trigger is generated
			Stop: Data capture stops when a trigger is generated
	Trigger conditions		Start: Off, Level, External, Date
			Stop: Off, Level, External, Date, Time
	Alarm judgment modes		Analog, Logic, Pulse
			Analog: H, L, Window IN, Window OUT
			Logic: H, L
			Pulse: H, L
Miscella-neous Functions	Scaling (EU) function		4 points can be set for each channel
	Review function		Data replay during data capture
	Statistical calculation	Types of operation	Average value, peak value, maximum value, minimum value, RMS
		Number of operations	2 can be set simultaneously
		Method	Realtime and between cursors specified (*3)
	Data Search	Function	Search the captured data for the required number of points
		Search type	Channel, Pulse, Logic, Level, Alarm search
	Annotation input	Function	A comment can be input for each channel
		Inputtable characters	Alphanumeric, Kana
		Number of characters	11 (Displayed up to 8 characters)
Monitor	Display		3.5-inch TFT color LCD (320 x 240 dots)
	Display screen	Waveform display	Waveform screen + Digital screen/Waveform screen
		Digital display	Waveform screen + Digital screen/Waveform screen + Calculation Display screen
	Screen saver function		10, 30 sec; 1, 2, 5, 10, 30, 60 min
Internal memory devices	Memory contents		Setup conditions/Captured data/Screen copy
PC I/F	Functions		Data transfer to the PC (realtime memory)
	Realtime data transfer speed		10 ms/1ch maximum
Data save functions	Measured data		Internal memory (3.5 MB Flash Memory) or direct capture in the USB memory device
	Other		Setup conditions, copy of data screen can be saved in the internal memory or USB memory device

*1 50 ms and below can be selected according to input settings and number of measured channels.
*2 Filter operation is on a moving average basis. The average value of the set sampling count is used.
*3 When the Digital screen + Calculation Display screen has been specified, the calculation results are displayed.

Accessory/Option Specifications

PC Software

Item	Special PC software ZR-SX10 Wave Inspire RX (Since Ver 2.3) (Option Specifications)	Standard PC software Smart Viewer RXW (Since Ver 1.04) (Standard accessories)
Compatible operating system	Windows Vista/XP/2000	
CPU	Intel compatible processor 1 GHz or faster recommended	Pentium 4: 2.0GHz or higher
Memory	• Windows 2000/XP: 512 MB or more (recommended: 1 GB or more) • Windows Vista: 1 GB or more (recommended: 2 GB or more)	512MB or more (1GB or more recommended)
Display	• 1024 x 768 resolution, or higher • 16-bit color or higher screen display functions (recommended: 24-bit color or more)	
Compatible interface	USB	
Standard functions	Review saved data, realtime capture of PC data, main unit setup, CSV file conversion	
Waveform operation	Drag & Move waveform directly Batch change of CH scale Intuitive operation by mousewheel	Change CH scales individually by icons
Waveform display	Displays multi-windows Displays all the CH multi-scales simultaneously X-Y display Scrolling for all directions (up, down, right, left)	Split display in the single window X-Y display Meter display selection
Configuration function	Smart Listview setup function Smart Grouping function	Setup in the tab format
Captured data	Binary file (original format) : Captured data and the information of graph window are saved. CSV file : Captured data is saved in Comma separated value format. Binary files can be converted to CSV files all at once.	
Others	Cursor function, Comment input function, Excel transfer function	

*1 When you capture the data by WaveInspire, please finish all the other application software and save captured data to hard disk.Even using the PC which fills enough specification, the capture error occurs at times because the PC is bad condition. (For example, the other application software works, or recording medium has no free area.)

*2 Don't start up the other application software, as WaveInspire works. And don't work other several operation. (For example, screen saver, virus scan program, copying or moving files, searching file etc.)

Battery Pack ZR-XRB1

Item		Description
Capacity		7.4 V/2200 mAh
Running time (*1) (*2)	When using the LCD display	Approx. 5 hours
	When using the screensaver	Approx. 6 hours
Battery type		Lithium secondary battery
Charging method		Mount in the main unit (ZR-RX20/RX40)
Time required for charging		Approx. 4 hours
Switchover in the case of a power failure		By using the battery together with the AC adapter, the power supply will be switched automatically to the battery in the event of a power failure.
Other functions		When the battery is running low, measured data is saved and the file is closed automatically.

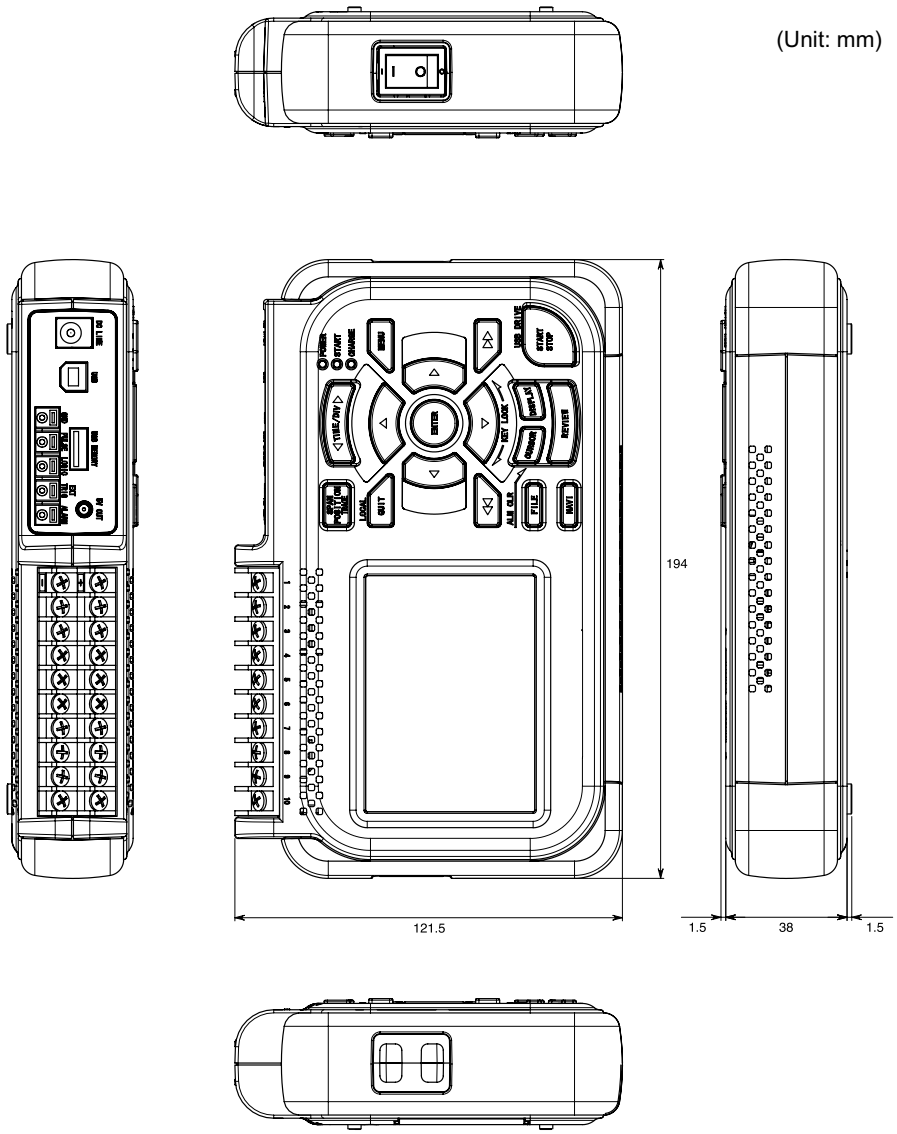
*1 When recording to internal memory at the sampling speed of 1 sec.
*2 Running time is different according to setting conditions including battery charge condition and connection of USB memory.

Humidity Sensor ZR-XRH1

Item	Description	
Allowable temperature range	–25 to +80 °C	
Allowable humidity range	0 to 100 % RH	
Method	Capacitance Method	
Relative humidity measurement accuracy (5 to 98%)	Measurement environment	Measurement accuracy
	0 to 10°C	±5% RH
	10 to 20°C	±4% RH
	20 to 30°C	±3% RH
	30 to 40°C	±4% RH
	40 to 50°C	±5% RH
	50 to 60°C	±6% RH
	60 to 70°C	±7% RH
	70 to 80°C	±8% RH
Relative humidity measurement accuracy	±3 % RH (5 to 98 % RH at 25 °C)	
Response time	15 sec (90 % response when membrane filter is installed)	
Sensor output	0 to 1 VDC	
External dimensions	∅14 × 80 mm (excluding cable)	
Cable length	3 m	

External Dimensions

(Unit: mm)



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Error Messages and Countermeasures

List of Error Messages

This section outlines the error messages that are displayed and the countermeasures for those messages.

Display	Details Cause	Countermeasure
Can't adjust zero voltage.	When the input voltage is over 0 point adjustable range,it is displayed.	Please adjust the input voltage within 10% of ± of a set range.
Data was not captured.	When the logging file that is not recorded by as much as one point is replayed, it is displayed. The error occurs before detecting the trigger by the file that stops logging.	Please start the data logging.
The replay file name has not been specified.	When the replay is executed without selecting the file, it is displayed.	Please select the logging file.
The replay file name is the same as the save file name.p	When the logging file and the saved file are selected by the same name when it preserves between cursors,it is displayed.	Please change the file name.
EU function had set ON can't change range.	When the range is changed with scaling on, it is displayed.	Please turn off the scaling function, and change the range.
The recovery could not be done.	When the power supply is turned off while data is being written in a built-in memory, the recovery processing is done. However when failing in the recovery processing, it is displayed.	The recording data cannot be replayed. Please do not turn off power while logging data.
Upper < Lower setting	When the upper and the lower are opposite in the span setting, it is displayed.	Please change to upper < lower.
Too narrow span setting	When the span setting width of voltage CH is set by less than 1% of full-scale, it is displayed.	Please change the span setting value to 1% or more of full-scale.
Too narrow span setting	When the span setting width of temperature CH is less than 50Âé,it is displayed.	Please change the span setting value to 50°C or more.
The load file name has not been specified.	When the setting file is loaded when it unselects the file, it is displayed.	Please select the setting file.
Out of input range.	When input value is over range,it is displayed.	Please change within the range of can the displayed setting.
Invalid trigger start settings. Press [Enter] key and change the settings.	When logging is started with the trigger setting not normally set,it is displayed.(START)	Please set the start trigger correctly.
Invalid trigger stop settings. Press [Enter] key and change the settings.	When logging is started with the trigger setting not normally set,it is displayed.(STOP)	Please set the stop trigger correctly.

List of File Error Messages

This section outlines the file error messages that are displayed and the countermeasures for those messages.

Display	Details Cause	Countermeasure
Disk I/O Error.(2)	File or directory is not found.	Set a correct file or directory.
Disk I/O Error.(9)	Invalid file format.	Filesystemn is invalid, and format it again, please. If the error is not canceled even if it formats it, might the media failure. Repair ZR-RX when a built-in memory is failure. Please use another USB memory when the USB memory is failure.
Disk I/O Error.(13)	It is displayed by either of following cause. • Not formatted. • Write-protected. • Memory failure.	• Please confirm whether write-protection is turning on. (For the USB memory with the write-protection function.) • Please format it. If the error is not canceled even if it formats it, might the media failure. Repair ZR-RX when a built-in memory is failure. Please use another USB memory when the USB memory is failure.
Disk I/O Error.(28)	It is displayed by either of following cause. • Disk is full. • Neither the file nor the directory are created any further.	"Disk is full" is usually displayed. Please increase the capacity of the disk as it erases an unnecessary file.

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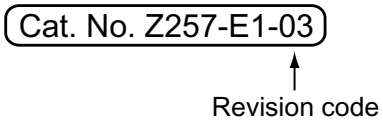
Revision History

A manual revision code appears as a suffix to the catalog number at the bottom of the front and back covers of this manual.



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WEB1	October 2007	Accessories changed, and minor corrections
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OMRON Corporation
Industrial Automation Company
Sensing Devices Division H.Q.
Application Sensors Division
Shiokoji Horikawa, Shimogyo-ku,
Kyoto, 600-8530 Japan
Tel: (81) 75-344-7068/Fax: (81) 75-344-7107

Regional Headquarters
OMRON EUROPE B.V.
Sensor Business Unit
Carl-Benz-Str. 4, D-71154 Nufringen,
Germany
Tel: (49) 7032-811-0/Fax: (49) 7032-811-199

OMRON ELECTRONICS LLC
One Commerce Drive Schaumburg,
IL 60173-5302 U.S.A.
Tel: (1) 847-843-7900/Fax: (1) 847-843-7787

OMRON ASIA PACIFIC PTE. LTD.
No. 438A Alexandra Road # 05-05/08 (Lobby 2),
Alexandra Technopark, Singapore 119967
Tel: (65) 6835-3011/Fax: (65) 6835-2711

OMRON (CHINA) CO., LTD.
Room 2211, Bank of China Tower,
200 Yin Cheng Zhong Road,
PuDong New Area, Shanghai, 200120, China
Tel: (86) 21-5037-2222/Fax: (86) 21-5037-2200

Authorized Distributor:

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